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FILE

AVIATION AND AIRCRAFT JOURNAL

Aerial View of Coney Island

VOLUME XI
Number 4

SPECIAL FEATURES

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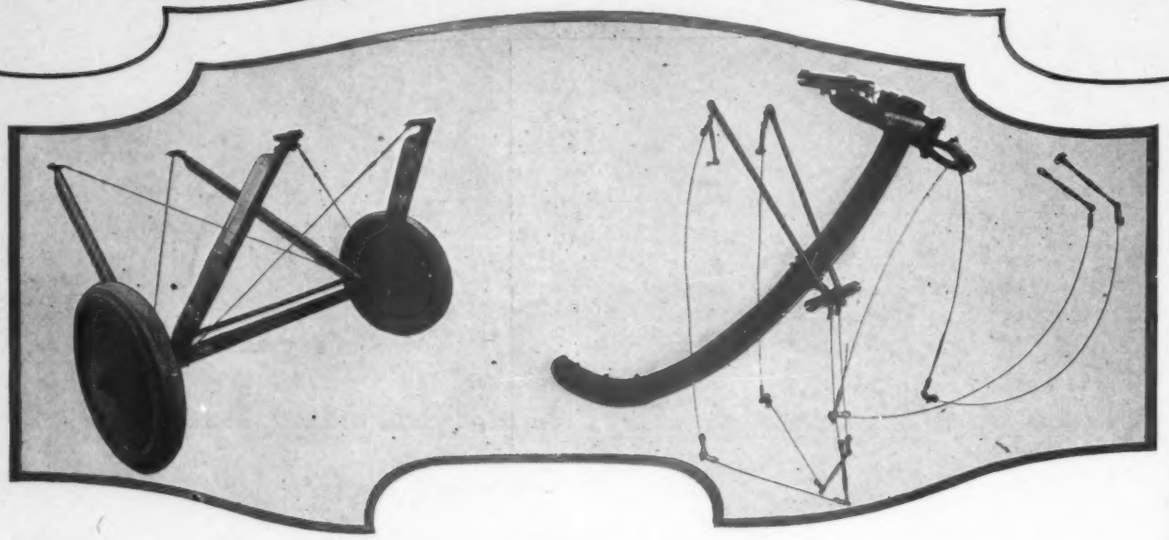

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AVIATION AND AIRCRAFT JOURNAL

JULY 25, 1921 VOL. XI. NO. 4

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INDEX TO CONTENTS

Editorials	95	Performance of a 300-hp. Hispano-Suiza Airplane Engine	108
President Harding Favors United Air Service	96	Relief Expedition of Airplanes to the Pueblo Flood	108
Bombing of Warships Proves Air Power	96	Airdrome Notes	109
Aircraft Accelerate Film Delivery	98	Railroad Reconnaissance by Airplane	110
Airships in Long Distance Transport	99	Italy's Surplus Aeronautical Equipment	110
The Future of Anti-Aircraft Artillery	100	R.Ae.C. Seaplane Races	110
Fairchild Co. Increases its Staff	100	International Balloon Race	110
McCook Field Bulletins Released	100	Naval Air News	111
The Remington-Burnelli Airliner	101	Trade Note	111
A Fast German Semi-Rigid Airship	101	N. Y. to Cleveland by Flying Boat	111
"Who's Who in American Aeronautics"	102	Naval Appropriation Bill Passed	111
DH-4 Emergency Flotation Gear	103	Foreign Aerial Transport	112
Examination of Laminated Airplane Spar	106	Aerial Police in Michigan and Canada	112
Book Reviews	106		
Across the Central American Andes	107		

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Thomas-Morse Training 2-Seater in flight over Ithaca, N. Y.

THOMAS-MORSE AIRCRAFT CORPORATION

A Thousand to One

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AVIATION AND AIRCRAFT JOURNAL

LADISLAS D'ORCY, EDITOR
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EDWARD P. WARNER
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Vol. XI JULY 25, 1921 No. 4

Air Service Unification

THE announcement that President Harding favors a single department to control all government aviation, military, naval and civil, comes at this time with such surprising suddeness that it is difficult to appraise the full effect that it will have on aviation in this country.

AVIATION AND AIRCRAFT JOURNAL which has printed many of the arguments in favor of such unifiication takes pride in the fact that in the issue of March 14, 1921 it forcasted the present situation in the following editorial comment:

"On the eve of his inauguration President Harding made an announcement to the press which is of the greatest importance to aviation in this country. He is reported as favoring the creation of a Department of Defense, headed by one Cabinet officer, which would have three divisions of virtually equal rank, the army, the navy and the air force. Each would be in charge of an under-secretary.

This news, while hidden in an obscure newspaper report, is cheering to all those who believe that the present method of handling governmental air activities is unworkable.

The British Ministry of defense has followed this plan but some of the practical workings of it have passed through the experience of all new experiments. Fundamentally, the idea is sound. Rivalry, jealousy and competition have no place in any scheme for national defense. By placing the air force in an equal plane with the army and navy, President Harding will be starting right and it is to be hoped that this consolidation will prove one of the great achievements of the Harding Administration."

After the above announcement was made, the information was circulated that a premature discussion might endanger the plan. It was therefore allowed to remain as an unverified rumor.

Meanwhile, on the advice of the National Advisory Committee for Aeronautics, the President took a position on aviation that has been regarded as reflecting departmental views. The President now appears to have heard the arguments of unprejudiced investigation and has decided to approve that plan which makes for efficiency and economy.

The Bombing Tests of the Warships

WITHOUT touching the technical aspect of the bombing tests made with the ex-German warships, on which judgment must be suspended pending the issue of an official report, it can nevertheless be said that off the Virginia Capes aircraft proved what their defenders contended, namely, their offensive powers against surface vessels.

A submarine, a destroyer, and an armored cruiser were in turn sunk by aircraft bombs. To be more accurate, the cruiser Frankfurt, a 5,000-ton ship was sunk by a single 600-lb. bomb. Who can any longer deny the striking power of aircraft?

Fineness Ratio in Airships

THE ratio of the overall length to diameter of an airship, called the fineness ratio, has long been recognized as one of the fundamental factors in its design, although its real effect on construction and performance is only beginning to be thoroughly appreciated. The great difference in dimensions between models and full size airships has made it impossible so far to predict performance from model tests alone. Hence development has largely been determined by the performance of individual ships. This has limited the number of experiments to so few units that it has taken a long time to overcome the fallacies and false premises upon which many airships theories were built.

In particular, the idea that a long slender body is required for attaining high speed has had a most remarkable vitality. This fallacy may have been due to the fact that the pre-war Zeppelins all had a fineness ratio of from 10 to 12. As these ships were much faster than their non-rigid contemporaries, from which they differed mainly through their shape, it was commonly assumed that they owed their performance to a high fineness ratio, when as a matter of fact this was mainly due the suppression of parasite resistance. However, during the war the finenes ratio of the Zeppelins consistently decreased, until in the post-war airship Bodensee it went below 7. More recent experiments indicate that with the proper lines of curvature good propulsive efficiency may be obtained at very much smaller ratios. In fact, some Forlanini airships, which are notable for the high speed they attain with a comparatively small power plant, have a fineness ratio of only 4, while the Roma, just purchased by the U. S. Army, is only five diameters long.

Another fallacious theory often heard is that a short ship may be all right for a low resistance but it would be unstable and uncontrolable. The unqualified success of the Goodyear Pony Blimp, with a fineness raio of less than 3½, has definitely disposed of this objection.

More recently the argument has been advanced that a large fat airship of rigid construction would be too heavy for its capacity. This is a perfectly valid point if by "rigid construction" there is meant the present Zeppelin type, which with its heavy ring frames and transverse load distribution is not suitable for very fat shapes without considerable modification.

But here again it must be conceded that most of the rigidity of the present types will be largely superfluous when the lower fineness ratio comes into general use. In other words, a *satisfactory* rigidity can be attained on a fat ship with far less structural complication than with a slim hull, and the former will be simpler and more practical in every way.

We believe that the proper design to suit these conditions will soon be forthcoming. When it does, the only remaining limitation will be the section size of hangars. For this reason it is of the utmost importance in the consideration of new airship hangars to make them of ample width and height.

President Harding Favors United Air Service

Endorses Unification as a Means of Economy and Efficiency

President Harding on July 14 let it be known that he favors the proposal to place all the aircraft services of the Government military and civil under one central authority.

The *New York Times* states that:

"There has been an impression that the President was opposed to this plan, especially when Major Gen. Menoher, Chief of the Air Service of the army, asked the Secretary of War to remove the Assistant Chief, Brig. Gen. William Mitchell, who was a persistent advocate of amalgamation of the army and navy air services. It was learned today, however, that the President is heartily in favor of the proposed amalgamation and that the Joint Reorganization Commission, which is engaged in preparing plans for a reorganization of the executive branch of the Government, is inclined to recommend the unification of all the Government's aircraft activities.

"The position of President Harding is that amalgamation will work for efficiency and economy. One great difficulty of the present separate aircraft services that has impressed him is that there is no systematic method of awarding contracts for the construction of aircraft. One branch makes contracts without regard to any other Government aircraft organization, and the President believes that this is detrimental to the upbuilding of private aircraft manufacture in the United States.

"The aircraft manufacturers are dependent almost entirely on Government patronage, as commercial demands are very small, and it is claimed that unless the Government so arranges its contracts as to distribute them among all those concerns which produce aircraft meeting Government standards some of them may be obliged to go out of business."

The inference is also drawn from what was learned today of the President's position that he is in favor of the amalgamation of the War and Navy Departments into a Department of National Defense. The plan under consideration by the Reorganization Commission contemplates having a Cabinet officer at the head of this department with Assistant Secretaries under him, in charge of the army, the navy and the aircraft service.

If the plans go through John W. Weeks, Secretary of War, is slated, according to the information, to be the head of the new Department of National Defense. Some other important post, then, would be offered to Edwin F. Denby, Secretary of the Navy.

By the consolidation of the two departments into one the committee hopes to accomplish a saving of not less than $150,000,000 a year, to come about through a joint administration of the services, the common purchase and distribution of supplies, and the standardization of small arms and other material. This is quite independent of the additional saving, variously estimated around $300,000,000 a year, for which the committee has been hoping. Other reductions, such as the reduction of department personnel and the prevention of much of the duplication of effort are now evident in the different bureaus.

Bombing of Warships Proves Air Power

Martin Bombers of Army Air Service Sink Destroyer G-102 and Cruiser Frankfurt

The bombing tests the Army and Navy Air Services are conducting with a view to determining the effect of aircraft bombs upon all classes of warships have afforded two more demonstrations of the vulnerability of surface vessels to aerial attacks. Following the sinking of the ex-German submarine U-117, the destroyer G-102 and the armored cruiser Frankfurt, both ex-German vessels, were attacked by Army and Navy aircraft and sunk. Following is a detailed account of these two tests.

The Bombing of the Destroyer G-102

On July 13 the former German destroyer G-102 was bombed and sunk by the Army Air Service in the course of the bombing tests now being carried out. The target was adrift off the Virginia Capes and the attacking machines used shore bases at Langley Field and Hampton Roads.

Brigadier General Mitchell, Assistant Chief of Army Air Service, organized and commanded the operations. The attacking aircraft consisted of 14 Martin bombers, 14 DH4B machines, 11 SE5 machines, 2 Capronis, and several observation and photographic machines. The Martins and DH4B's carried 300 lb. demolition bombs while the pursuit machines carried 25 lb. Cooper bombs for destroying, or driving below deck, the "personnel" of the target.

Visibility was good with sunshine and some low hanging clouds. Operations began at 9 a.m. with the arrival of the first surveillience machines over the target. Half an hour later the SE5's released 40 bombs and scored 20 direct hits. At 10:10 o'clock 14 Martin bombers and 14 DH4B's attacked; the former releasing 44 bombs and the latter 7. Out of these two direct hits were observed while a third bomb hit the bow of the G-102 as it sunk. The demolition bombs were dropped from between 2,000 and 2,500 ft. altitude and the Cooper bombs from a much lower altitude.

The first direct hit was made by one of the DH4B's at 10:28, and the target began to sink rapidly. It was then that the second direct hit was made by one of the Martin machines. The bomb struck amidships and the target sunk at 10:40. The attacking machines used less than half their bombs. The 28 Martins and DH4B's carried 168 bombs of which 51 were dropped, while the pursuit machines dropped 44 Cooper bombs.

Brigadier General Mitchell flew from Langley Field in a DH4 machine and was over the target when the first machines arrived. He followed both the pursuit machines and the Martins and DH4B's over the target, frequently approaching at a low altitude to observe the effect of hits.

Precautions were taken against machines having forced landings and destroyers were stationed at seven mile intervals from the shore to the target.

Maj. Gen. Charles T. Menoher, Chief of Air Service, watched the tests from one of the escorting ships in the company of foreign air attachés.

The Bombing of the Frankfurt

On July 18 the bombing tests of warships were resumed when Army and Navy aircraft attacked the ex-German cruiser Frankfurt and sank her.

The tests conducted with the Frankfurt acquire particular importance from the fact that this vessel possessed armor protection, whereas the submarine U-117 and the destroyer G-102, previously bombed and sunk by aircraft, were unarmored ships. The Frankfurt was one of the later types of German light cruisers, laid down in 1913, and completed in September 1915. She took part in the battle of Jutland and was reported

as the first ship to sight the British as the fleets came in contact. She was sunk by her crew at Scapa Flow after the surrender, but was salvaged and sufficiently reconditioned to be able to cross the Atlantic under tow. The Frankfurt had a normal displacement of about 5,100 tons and a designed speed of 28.5 knots. Her battery consisted of eight 5.9 in. guns and two 19.7 in. torpedo tubes. Her armor protection comprised a side belt 5.9 in. tapering to 3.9 in. forward, and 3 in. aft, and a protection deck of 1.5 in.

The bombing of the Frankfurt, which took place 60 miles off the Virginia Capes, was jointly conducted by the Army and Navy Air Services. The aircraft employed comprised twelve naval F-5-L flying boats, and fifteen Martin bombers of both the Army and Navy Air Services.

The tests consisted of two phases, light bombing and heavy bombing. Fifty-four bombs, weighing from 250 lb. to 300 lb. each were dropped in the first phase from F-5-L seaplanes and Martin bombers, while in the second phase twenty-four bombs of 520 lb. and 600 lb. each were used. Ten of these were 520-lb. bombs, dropped by naval Martin bombers, and fourteen were 600-lb. bombs dropped by Army Martin bombers.

The bombing attacks started at 9:12 a. m. by the Fourth Division of naval F-5-L seaplanes commanded by Lieutenant Commander Strong, the other pilots being Lieutenants Eddy and Noble, and by the Fifth Division of naval F-5-L seaplanes commanded by Lieutenant Price, with Lieutenants Stump and Williams as pilots. The six machines dropped twelve 250-lb. bombs and scored one direct hit abaft of the Frankfurt's foremast.

The second attack was made by a division of two Army Martin bombers piloted by Lieutenants Meyers and Morris which dropped twelve 300-lb. bombs. No direct hit was made, although one bomb came near hitting the forecastle. Big spouts of water went up as the bombs dropped around the ship and the concussion caused by their detonation was felt against the sides of the observation vessels at a distance of several thousand yards.

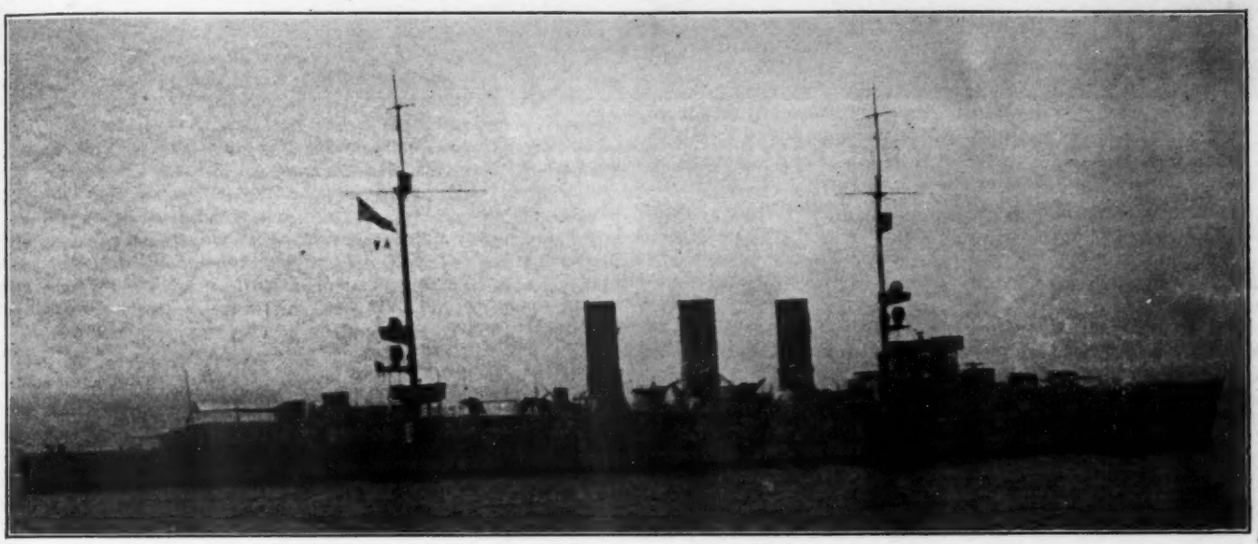
The third attack was made by the Second Division of naval F-5-L seaplanes, piloted by Lieutenants Vaini, Carlson and Farnham of the Marine Corps. The three machines dropped six 250-lb. bombs, but scored no hits.

The fourth attack was made by an Army Martin bomber piloted by Lieutenant Kirksey, who dropped six 300-lb. bombs, making one hit. This bomb struck abaft of the aft smokestack, throwing deck wreckage into the air. After this attack there was an hour's halt during which the air flagship Shawmut took the official observers on board the Frankfurt to determine the damage done by the bombs. Their verdict was that while severe damage had been done to the deck and upper works of the Frankfurt, the hull seemed intact, for no water was entering it.

The bombing was resumed with the fifth attack which was made by the First Division of naval F-5-L seaplanes piloted by Lieutenants Thomas, Keene, Rummill and Garvey, one going along as an observer. The three machines dropped six 250-lb. bombs, but failed to score a hit.

The sixth attack, was made by three Army Martin bombers piloted by Lieutenants Crocker, Graydeal and Monahan, also proved fruitless, for no hit was made out of the twelve 300-lb. bombs dropped. This attack ended the light bombing tests, and at 2.28 p. m. the heavy bombing phase began.

The first heavy bombing attack was made by the Seventh Division of naval Martin bombers commanded by Lieutenant Commander Hartlett. The three machines dropped four 520-lb. bombs, the first bomb landing between the first and second smokestacks, tearing up the armored deck of the Frankfurt. Half an hour later the same division dropped six more 520-lb. bombs in two salvoes and registered one direct hit aft of the mainmast. The second of the hits by this division when examined by the board of observers was found to have gone down through the stern and come out of the hull above the waterline without doing great damage. It was apparently a "dud" bomb.



Ex-German Armored Cruiser Frankfurt Sunk by a 600-Lb. Aircraft Bomb on July 18

By this time the Frankfurt, although badly punished in her superstructure, was still afloat, and plans were being made by the assembled fleet for her destruction by gunfire or by time bombs. While the observers' board was examining the effect of the bombs on the Frankfurt, an Army division of Martin bombers, commanded by Captain Lawson, with Captain Pascole and Lieutenants Post, Raley, Speck and Harris, arrived at the scene. The six machines, four of which carried four 600-lb. bombs each, had come from Langley Field with little more fuel than that required for a return flight. As the observers continued to remain on board the target ship Captain Lawson, who was circling overhead with his division, wirelessed to the Shawmut: "Must begin bombing within fifteen minutes; fuel limited." The Shawmut then drew away from the Frankfurt and signaled to the Army planes: "Proceed to attack."

Captain Lawson's division did so at once. Changing their V formation to single column, his machines began circling the target. Only four of the Martin bombers actually dropped bombs, fourteen altogether, but their work was so effective that it soon called a halt to the expectations of those naval officers present who had insisted that the Frankfurt could not be sunk by aircraft bombs. Of the bombs dropped by the four Army Martin bombers two landed amidships from the 3,000-ft. altitude at which the attack was made. These direct hits tore

A Flight of DH-4B Bombers Leaving Langley Field to Bomb the Ex-german Destroyer G-103 off the Virginia Capes
Photo International

much of the superstructure away and caused the target ship to rock violently, but she was still afloat when the smoke cleared. It was then, at 4:25 p. m., that the single bomb which sank the Frankfurt was dropped. This bomb did not hit the target, but fell alongside just off the starboard bow, and when it exploded it lifted the Frankfurt several feet out of the water. A great spout of water shot up on both sides of the doomed ship, evidence that the bomb had exploded almost directly under the forward keel. As the Frankfurt settled back it was evident she was sinking. Her starboard bow was crushed in and her compartments were filling with water, for the ship took a list and twenty-eight minutes later she went down stem first.

A division of naval NC seaplanes was circling the target at this time, prepared to finish the job of the Army, but this was so well done that no help was needed. The Frankfurt sank before the official observers on the Shawmut could board her to determine the nature of the hit which sent her down.

Aircraft Accelerate Film Delivery

Aircraft played an important role in connection with the Dempsey-Carpentier fight, when films taken at the ringside were delivered to steamers bound for Europe after they had sailed. In this manner an Aeromarine flying boat speeded up the delivery of the fight pictures by three days. The machine waited in Newark Bay for the films. By the time they had been developed and rushed to the machine the steamer Zealand was already out at sea, but the flying boat caught up with it in less than an hour and dropped the roll of films on the deck of the vessel.

The Newspaper Enterprise Association used airplanes to speed up the delivery of the fight pictures on the Pacific Coast. The bout was over at 3:30 p. m. Saturday and at 12:15 p. m. Monday about 48¾ hours later, the pictures of the bout were delivered in San Francisco.

The plates were taken from the arena to airplanes about a mile away by motorcycle carriers. The machines took off at 3:50 p. m. for Cleveland, where they landed at 8:50 p. m. after stopping at Bellefonte, Pa. to refuel. An hour after the arrival of the pictures in Cleveland the papers had published a special edition containing them. From Cleveland the plates were taken by special train to Chicago. To the train was attached a baggage car fitted out as a dark room and in this the plates were developed enroute during the night. The train arrived in Chicago at 4:50 a. m. Sunday, and at 8:30 the pictures were on the way to North Platte, Nebr. by the Air Mail. Arriving there at 3:00 p. m. they were transferred to the railroad, and taken to Rock Springs, Wyo, where another Air Mail machine carried them on to San Francisco, only stopping to refuel. The pictures were delivered to the office of the San Francisco Daily News after their arrival at the airdrome at 12:15 p. m. Monday.

An Ansaldo enclosed cabin machine, the property of Ralph Diggins of Chicago made an excellent flight from that City on July 3 to North Platte in relaying some of the fight pictures. The flight of nearly 700 miles was accomplished in a driving rain. The Ansaldo machine arrived at North Platte at 2 p. m., with plenty of time for the train for the west which arrived at 3.20 p. m. A stop for fuel was made at Des Moines.

A fast flight from Los Angeles to Chicago and back to fetch pictures of the recent Carpentier-Dempsey fight for the Los Angeles Examiner was made by Frank Clarke on a Fokker fitted with the Hall-Scott L-6 engine. This fine performance made it possible for pictures taken at the ringside on July 2 to be printed and on the streets of Los Angeles on the evening of July 4.

The outward trip from Los Angeles to Chicago was made with a passenger in 19 hr. flying time including two over-night stops. At Chicago an extra tank was fitted in the passenger seat and the trip back home was made in 18 hr. flying time with one over-night stop at Salt Lake City.

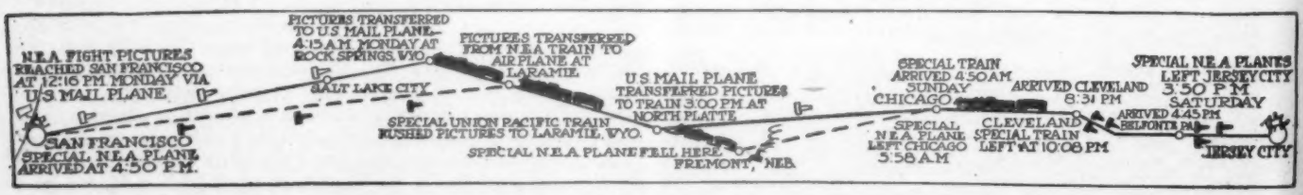

N.E.A. FIGHT PICTURES REACHED SAN FRANCISCO AT 12:16 PM MONDAY VIA U.S MAIL PLANE.
SAN FRANCISCO
SPECIAL N.E.A. PLANE ARRIVED AT 4:50 P.M.
PICTURES TRANSFERRED TO U.S MAIL PLANE 4:15 A.M. MONDAY AT ROCK SPRINGS, WYO.
SALT LAKE CITY
PICTURES TRANSFERRED FROM N.E.A. TRAIN TO AIR PLANE AT LARAMIE
SPECIAL UNION PACIFIC TRAIN RUSHED PICTURES TO LARAMIE, WYO.
U.S MAIL PLANE TRANSFERRED PICTURES TO TRAIN 3:00 PM AT NORTH PLATTE
SPECIAL N.E.A. PLANE FELL HERE FREMONT, NEB.
SPECIAL TRAIN ARRIVED 4:50 AM SUNDAY CHICAGO
SPECIAL N.E.A. PLANE LEFT CHICAGO 5:58 A.M
ARRIVED CLEVELAND 8:31 PM
CLEVELAND SPECIAL TRAIN LEFT AT 10:08 PM
SPECIAL N.E.A. PLANES LEFT JERSEY CITY 3:50 P.M SATURDAY
ARRIVED 4.45 PM BELFONTE PA.
JERSEY CITY

Diagram Showing how the Dempsey-Carpentier Fight Pictures were Carried Across the Continent in 48¾ hr.

Airships in Long Distance Transport

The following article which was contributed to the London Observer by Lord Montague of Beaulieu sheds an interesting light on the commercial possibilities of airships with particular reference to those now in British hands. Owing to the financial retrenchment policy adopted by the British government all but the most modern airships of the Royal Air Force were scrapped after the armistice. According to recent advice even the L64 referred to in the article which follows has now been scrapped in order to afford hangar space to the R36, the latest British rigid airship. EDITOR.

The new Secretary of State for Air, Major F. Guest, M. P., came to a wise decision when he reversed, or rather suspended for a further period, the policy of his predecessor Mr. Winston Churchill in the matter of airships. Four months ago they had been condemned to disappear at once, for it had been decided that unless a commercial syndicate came forward to take over the existing airships and their organisation everything should be scrapped and the airship department closed down on May 1. A definite reprieve, however, until August 1 has now been decided upon, and it is hoped that a group of far-seeing and enterprising commercial men may be found before then to take over the valuable plant and the four airships which have cost together so many millions, for a sum perhaps only a very small proportion of the original expenditure.

As regards airships, there can hardly be any doubt that for long-distance non-stop journeys, such as England to Egypt, to India, to the Far East, to West, East, and South Africa, airships rather than the airplane must eventually be the means of our conveyance. Before the end of 1918 one of our airships had spent 104 hours in the air without coming down, and everyone knows of the wonderful flight made by a German airship from Belgrade to Khartoum and back, a distance of over 2,400 miles. It is also not generally realized that over 2,000,000 miles were flown during the war by airships of different types without accident.

We have now in this country four large airships, R33 and R36 of British make, and L64 and L71 built in Germany in 1918, and handed over to us under the Peace terms, besides two smaller ships of no real value for long distance traffic. L71 is the largest airship at present in existence, although the Zeppelin Co. in Germany are designing larger types already. She could carry thirty-five passengers and two tons of mail or valuable freight, on a flight as far as from Bedford to Egypt, performing the journey of 2,500 miles in a little over fifty hours. Against this our own R36, our biggest British-built airship, could not fly with more than a ton of useful load to Egypt in about the same time. It is interesting to note in regard to L71 that the German designers and builders intended her to fly if necessary to Japan without a stop from Germany, and in the case of their new airships are ready to deliver them to Japan in that way.

Night Service to Paris

It may interest readers to know that to make a start it has been suggested that R36, which can take fifty passengers, and is fitted with comfortable dining and sleeping accommodation, will probably be run during the latter half of this summer between some English station, say Croydon, and certain towns on the Continent such as Paris, Brussels, or Amsterdam. It is intended also to make this service a night one, so as to provide a means of crossing when there is no other service available, leaving the neighborhood of London at 11 p. m., and reaching Paris or Brussels in the early morning so that passengers may be at their hotel for bath, breakfast or business about 8 a. m. But this scheme involves the erection of additional mooring masts, and it may be August before this is accomplished, although most of the material for them is in stock already. These short services are better than none, but a correct paralled would be the use of the Mauretania on a cross-Channel service. The distance is too small to be a real test.

It may be asked, why has the airship been so neglected of late, and only attention paid to the aeroplane since the war? The answer can be found in two directions. First of all, there was the expense of building sheds, which were till lately thought to be absolutely necessary for airships, a shed often costing more than half the ship itself. But the mooring mast system has now superseded the need of a shed almost entirely, except for docking purposes, to use a marine term, and mooring experiments at Pulham with R33 have been so successful that it has now been established that an airship can leave and return to her moorings in practically any weather.

Germany Awaiting her Chance

But it is not only in England that attention once more is being directed to airships.In America a company has been formed with a large capital to establish airship services between various points in the United States, and eventually with the object of linking up America with England and the Continent over the Atlantic. Again, Japan is making inquiries as to airships, while Italy is continuing the use of her successful M series, which did such good work in Tripoli in the last war there. France is spending about a million sterling this year on airship services, and, as before mentioned, Germany is only waiting until the explration of the alloted time stipulated by the Treaty of Versailles to start airships again on a big commercial scale. It is clear, therefore, that other nations are realising the value of the airship for commercial purposes, and the paltry quarter of a million which is all that the airship service here requires to finance its expenditure for the next six to eight months does not make a very brave show, considering the relative circumstances, alongside the efforts of other countries.

The second reason for the decline in interest in airships is to be found in the fact that the supporters of the airplane are severe critics of the airship. Many of these decry the possibility of its use in time of war, and to some extent there is justification for their opposition. There can be no doubt that the enormous size and inflammability of a dirgible make it an easy and vulnerable target. And the use of non-flamable helium gas is as yet impracticable. But, after all, the Germans used airships most successfully over the North Sea, from Borkum in the southwest to the Norwegian coast in the northeast, during the greater part of the recent war, and at the battle of Jutland the escape of the German Fleet was principally brought about by the fact that, whereas it had information from airships, we had none, and while they could locate our Fleet we could not locate theirs.

There is no doubt, therefore, that airships of some sort are a necessity to a modern fleet, and even if they have to be protected by aeroplanes in the same way that battleships are protected by destroyers from submarines, that is not an insuperable objection.

Financial Points

Now let us consider a long-distance service of London to Africa and Asia via Egypt, which would really show the innate advantages of the airship. It is approximately 5,000 miles, with Egypt as a half-way house, to Karachi. The actual flying time from London to India would be about 100 hours. To this time must be added, say six hours in Egypt for examination and refilling with hydrogen and fuel, making a period of about four days ten hours, or say four and a half days. This, compared with the time taken by the fastest modern ship and train combined,of sixteen days, gives a clear saving of about twelve days. Of course, to Egypt and on to points in Asia and Africa a higher charge would have to be made for air-conveyed letters. But as over 34,000 letters of an ounce each are comprised in one ton of weight, at 1s. an ounce, this would produce £1,700 revenue per ton. This is good return for an airship carrying two tons each way, for it should be able to do the complete journey to India and back every twelve days, or about thirty journeys a year. The postal revenue, therefore,

on this basis would be over £200,000 a year per airship, less Post Office charges.

To run such a service effectively six dirgibles would be needed, of which we now possess four. Two more airships are therefore needed, which would cost in round figures £225,000 apiece. In addition to this there would have to be an expenditure in Egypt for mooring masts and bases needed of about £300,000, and at Karachi the mooring mast and certain buildings would cost about £125,000. This makes £900,000 the sum necessary to start a service to the East, with six airships with properly equipped bases, or say, £1,000,000 in all, allowing £100,000 for working capital which would be necessary to a company undertaking this enterprise.

Aid for Fishing Fleets

Finally let the airplane critics, as well as the public, remember that airships are useful for many purposes for which aeroplanes are not suitable. For the purpose of a careful survey of land or sea below, hovering or progress at a very slow speed is necessary. For instance, Fishery Boards declare that the locating of shoals of fish would be most valuable to our fishery interests and insure a larger and cheaper supply of fish for our population here and for export. Herrings and mackerel in particular always travel in shoals, and while their supply seems inexhaustible the demand for them is immense. The use of R33 to assist in the management of the Derby Day traffic is another instance of how the lighter than air machine can do excellent service. Then, again, there is the exploration work to be done over hitherto unexplored and undeveloped country like Central Africa, Western Brazil, South-Western China, and parts of Turkestan and the country north of the main ridge of the Himalayas. Then there are great possibilities of surveying correctly unknown countries much more cheaply and effectively than the usual methods on foot or with animals. Investigation of meteorological phenomena will be also easier if we can remain in the air for four or five days consecutively.

But at the moment every effort should be made to develop the commercial aspect. and considering the immense potentialities for national service of many kinds, I hope most earnestly that the Government will continue to provide for airship operations even if in three or even six months a commercial group has not been found to take over existing airships. Money is now very hard—almost impossible—to find for new enterprises, and at least a year should be allowed before any final step is taken to disband the small but magnificiently keen body of experts, or to scrap airships and their organization which have cost over forty millions sterling during the last few years.

The Future of Anti-Aircraft Artillery

By Robert V. Morse

No progress, no development of strength, is possible unless we are willing to study and analyze the weak points in our defense; and nothing more insidiously saps military strength than a relaxation of the inquiring facilities lulled by the comfortable tradition that methods and matérial which have been used in the past must be fairly all right.

In discussing anti-aircraft artillery it must be recognized that it is still in its infancy; the airplane is a new thing, and anti-aircraft fire still more recent.

A certain amount of time will always be necessary to get the projectile up to its point of burst. During this time interval the target may move to any point in a sphere of considerable diameter. Though it may be theoretically possible for the target to be at any point in such a sphere in a certain time, it is unlikely to turn directly back on its course, or to make violent changes in its direction every few seconds. Also, the target is not likely to slow up when under fire, but will generally proceed at full speed.

For practical purposes then full weight should not be given to all points within the theoretical sphere. Rather should an endeavor be made to assume a shape or figure which will reasonably include the future position of the airplane in the majority of cases.

Targets will be found at altitudes from the 100 ft. of the armored planes to the 15,000 ft., or more, of the photographic reconnaissance planes. Fighting planes, in the course of duty, may go to extreme heights though it is perhaps safe to say that fully three-quarters of military flying is at 10,000 ft. or under. Certainly if anti-aircraft artillery could effectively control the air up to say two miles altitude it would be of great military value. Leaving the lower levels to the machine guns, and admitting that at the most extreme altitude the artillery has the chances all against it, let us consider the more thickly infested regions with which artillery must deal—say from 5,000 to 10,000 ft. altitude.

Though perhaps the majority of planes are found below 10,000 ft. take 10,000 ft. as a fair average altitude, not too extreme in either direction. The time of flight of our present projectiles up to this altitude varies from 6 sec. at fairly high angles of fire (70 deg. to 75 deg.) to about 12 sec. when the angle is as low as 30 deg. to 35 deg. For example at 45 deg. the time is about 9 3/5 sec. From scale we find that the probability area in the 10 sec. region is equal to 1.3 spheres 100 yards in diameter, or at the 9 3/5 sec. interval the probability area is substantially entirely within the sphere of destruction.

From an examination of different angles of fire and altitudes the conclusion may be made that with the future development of matérial, the mere fact that the projectile will require considerable time to travel through the air does not necessarily preclude anti-aircraft artillery from becoming a very effective arm. The conclusions arrived at after an investigation of the future of anti-aircraft fire are that; (a) the rapid motion of the target and the time interval involved in the flight of the projectile do not necessarily preclude the development of anti-aircraft artillery as an effective defensive arm, (b) future development will depend chiefly upon the elimination of dead time and the continuous and precise adjustment of the fire control elements; the elimination of possibilities of personal errors, and the localization of responsibility for results. This indicates the development of automatic instruments to perform all the fire control adjustments not requiring personal discretion, (c) adjustment of fire by observation of a secondary factor will become more feasible as more precise and automatic fire control is developed, and (d) the economic advantages of anti-aircraft artillery when more perfected will probably justify its extensive use at important centers, to release our air-fleet much as our coast defenses release our navy.—*Journal of U. S. Artillery.*

Fairchild Co. Increases Its Staff

Lt. L. McSpaden, lately of 24 Squadron, First Army Observation Group, Air Service, has recently been retained by the Fairchild Aerial Camera Corp.

Lt. McSpaden graduated from the University of California and was one of the most experienced aerial photographic pilots in the U. S. Army Air Service. He did extensive work in France and has actually flown and surveyed while at work with Captain Stevens and other officers of the Photographic Section, 1000 square miles of territory in the United States. The territory comprising the 300 square miles of Camp Benning was not only flown over but the resulting mosaic was assembled and brought to scale by his persistent efforts to prove the practicability and accuracy of the aerial survey.

At McCook Field, Dayton, Ohio, he flew and personally assisted in a series of tests to determine the most efficient and satisfactory aerial equipment to be adopted by the Air Service. The mosaic of Washington, photographed in 1919, was one of the first attempts completely to photograph a city, and its success was due to the efforts of Captain Stevens and Lieutenant McSpaden.

Lieutenant McSpaden is now conducting a series of tests which it is expected will increase the commercial possibilities of the aerial camera by producing accurate survey and precision maps.

McCook Field Bulletins Released

We are informed by the Chief, Information Group, Air Service that the Office of the Chief of Air Service has on hand a number of complete sets of McCook Field Bulletins which have been declared no longer confidential and which will be sent to reputable manufacturers, designers, engineers, and others engaged in aeronautical endeavors, upon request.

The Remington-Burnelli Airliner

The following additional information is available with regard to the Remington-Burnelli twin-engined passenger carrier built by the Airliner Engineering Corp., which was illustrated and summarily described in the July 4 issue of AVIATION AND AIRCRAFT JOURNAL.

The R.-B. Airliner was built with a view to deriving the maximum benefit from the advantageous features of a twin-engined type without, however, incorporating its drawbacks. The desirability of affording easy access to the engines in flight led to the adoption of a central engine room. The mounting of the two engines close together answers the purpose of reducing the turning moment when the machine is flying on one engine only. By combining the nose of the conventional cabin fuselage and the outboard engine nacelles and their bracing into a unit of frontal area, a large amount of parasite resistance was done away with. As the resulting fuselage of large width is built in the shape of an aerofoil, it is made to contribute to the lift of the airplane, with a corresponding deduction from the wing span.

Wind tunnel tests show that the body has a lift at zero angle at 90 m.p.h. of 5 lb./sq. ft. The center of pressure run is practically nil, as the designer's main effort was to eliminate wide C.P. run on the fuselage. The utilization of the fuselage area as a sustaining surface, however inefficient, eliminates to a large extent its projected area as a parasite resistance factor.

The central arrangement of the engines allows a direct landing gear attachment to the fuselage, whereby the necessity of carrying the landing gear load through the wing truss is done away with. This makes for greater safety and structural efficiency. A further advantage of this design is that engine vibration or propeller breakage will not materially affect the strength of the wing truss. The fact that the machine uses a deep section high-lift wing—the Glenn Martin M-2—makes it possible to brace the large wings with a single bay truss, which further reduces parasite resistance.

The general characteristics of the R.-B. Airliner, which was summarily described and illustrated in our July 4 issue, are as follows:

GENERAL CHARACTERISTICS OF THE R.-B. AIRLINER

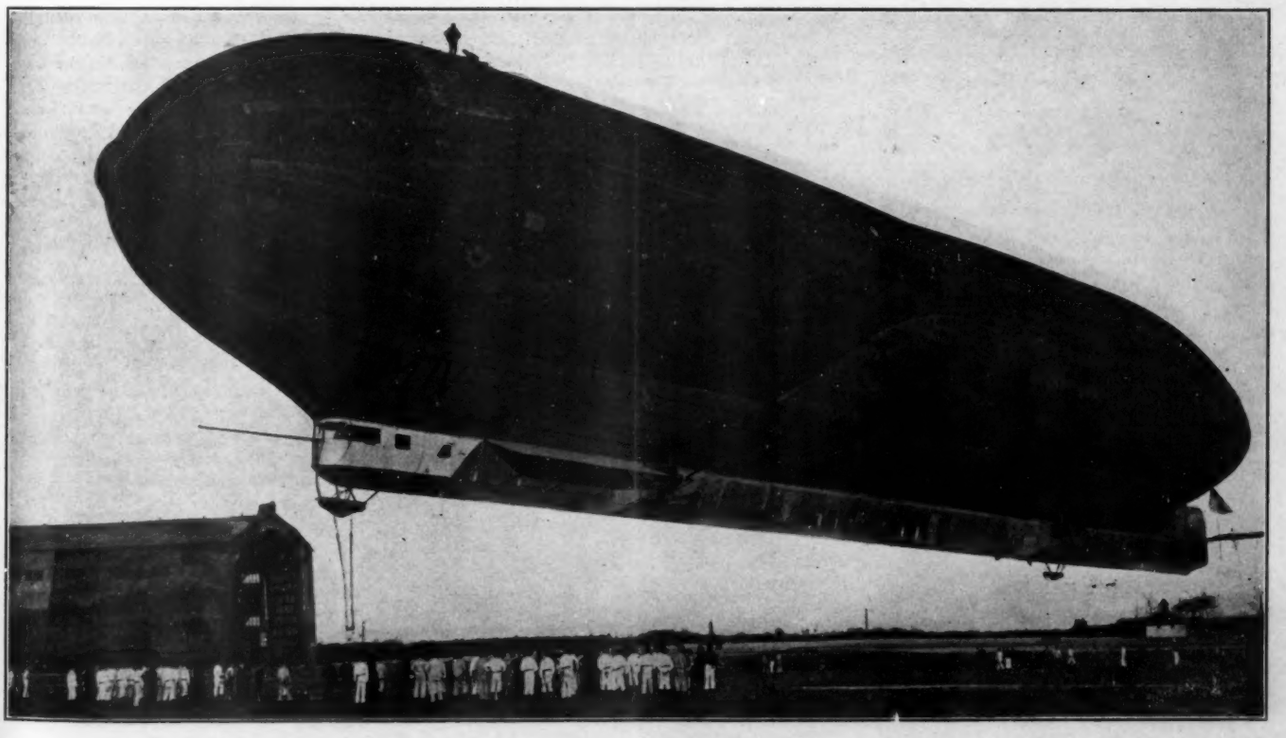
Span, upper and lower wings	74 ft.
Length overall	42 ft.
Height maximum	16 ft. 6 in.
Chord	10 ft. 6 in.
Gap	11 ft. 3 in.
Wing area	1,400 sq. ft.
Fuselage area (lifting)	505 sq. ft.
Angle of incidence	2½ deg.
Sweepback	4½ deg.
Stagger	none
Dihedral	1 deg.
Maximum depth of wings	22 in.
Length of fuselage	36 ft.
Width of fuselage	14 ft.
Height of fuselage	6 ft. 6 in.
Weight empty	8,600 lb.
Weight loaded	15,000 lb.
Engines	2-400 hp. Liberty
Fuel capacity	320 gal.
Seating capacity	30 passengers
High speed (designed)	105 m.p.h.
Landing speed (designed)	45 m.p.h.
Climb (designed)	5,000 ft. in 10 min.

The following remarks by Bert Acosta, test pilot for the Airliner Engineering Corp., on the behavior of the machine were made after six test flights under various conditions:

"Plane handles remarkably easy and is very steady on landing. Longitudinal control is excellent. Acceleration on take-off is very rapid. Vibration is absent. Visibility is very good."

The development of the R.B. Airliner is due to the joint efforts of George C. T. Remington, who financed the enterprise; Vincent J. Burnelli, chief engineer and designer; William P. Sullivan, assistant engineer, in charge of inspection; and John Carisi, factory superintendent.

A Fast German Semi-Rigid Airship



THE GROSS-BASENACH AIRSHIP M.IV (706,000 CU. FT., 540 HP.), THE ONLY SEMI-RIGID SHIP USED BY THE GERMANS IN THE LATE WAR, WHICH HAD A SPEED OF 74 M.P.H. THE KEEL WAS A GIRDER OF STEEL TUBING.

"Who's Who in American Aeronautics"

(Copyright, 1921, by The Gardner, Moffat Co., Inc.)

Every week, AVIATION AND AIRCRAFT JOURNAL prints the biographical sketch of men who are prominent in American Aeronautics. These sketches will be published later in pamphlet form. As so many of the officers change their stations often, it is believed that a semi-annual issue will be necessary. In compilations of this character many errors and omissions occur. It will be appreciated if corrections are sent to "Who's Who" Editor.

Louis Montague Rolfe

ROLFE, LOUIS MONTAGUE Commercial Aviator; born, London, England, May 6, 1894; son of Louis Runnicles Rolfe and Elizabeth Rolfe; married, Florence Ann Mattingly, Feb. 20, 1917.

Educated: English private schools.

Aeronautical Activities: Partner, Rolfe Bros., Aero Model Builders, 1909-1914; experiments with gliders and power driven planes; first solo flight at age of 16; came to America, April 1914 and attended Curtiss Aviation School; three years exhibition work in middle west and south, 1915-1917; winters spent in building planes and operating flying schools; designer and builder of Rolfe exhibition, training, and commercial pusher and tractor biplanes and flying boats; pilot of every type of land plane, sea plane and flying boat; carried 4874 passengers without accident; personally trained many students; 1759 hrs. in air as pilot; founder of Rolfe-Epps Flying Co,, April 1919; Manager, Augusta Aircraft Co. Inc., Aug. 1920 to date; has flown in 23 states.

Present Occupation: Manager, Augusta Aircraft Co. Inc.

Address: 211 Herald Bldg., Augusta, Ga.; home, (winter) Daytona Beach, Fla.; present address, Cuba 58, Habana, Cuba.

Warren Dempsey Williams

WILLIAMS, WARREN DEMPSEY, Pilot, U. S. Air Mail Service; born, Richland, Ga., Oct. 3, 1894; son of James T. Williams and Fannie (Snellings) Williams.

Educated: High School, Savannah, Ga.

Aeronautical Activities: Photographic detachment, 1st Aero Squadron, Jan. 1917 to Jan. 1918; in charge photo section No. 1, 1st Observation Group, Advance Zone, A. E. F., Feb. 1918 to Sept. 1918; Pilot, A. E. F., Nov. 1918 to April 1919; instruction, Mitchel Field, May and Sept. 1919; U. S. Air Mail, Aug. 1920.

Flying Rating: Brevet D'Aviateur Militaire, No. 17703, Nov. 1918; Reserve Military Aviator.

War Service: U. S. Army, Dec. 1916 to May 1920.

Present Occupation: Pilot, U. S. Air Mail Service.

Address: Air Mail Field, Cleveland, Ohio; home, 509 West 35th St., Savannah, Ga.

Frank Henry Russell

RUSSELL, FRANK HENRY, Airplane Constructor; born, July 17, 1879; son of Frank Russell and Aurelia (Henry) Russell; married, Marietta Ford, Dec. 31, 1902.

Educated: Berkley School; Bridgeport High School; A.B. Yale.

Professional: Manager of Sales of Laurentde Paper Co. in Grand Mere, Que.; President of Automatic Hook and Eye Co. of Hoboken; Manager of Wright Co., Dayton, Ohio; Manager, Vice President and President of Burgess Co. in Marblehead; Vice President and Manager of Curtiss Co

Member: Yale Club; Eastern Yacht Club; Manhasset Bay Yacht Club; Aero Club of New England; Aero Club of America; University Club of Washington.

Present Occupation: Vice President and Manager of Curtiss Aero and Motor Corp.

Address: Garden City, L. I., N. Y.; home, 14 Gregory St., Marblehead, Mass.

Thomas Henry Johnston, Jr.

JOHNSTON, THOMAS HENRY, Jr., Lumber Business; born, Birmingham, Ala., April 17, 1898; son of Thomas Henry Johnston, Sr. and Anne (Alexander) Johnston.

Educated: Central High School, Birmingham, Ala.; University of Alabama.

Professional: Lumber business since May 1919.

Aeronautical Activities: Ground School, Atlanta, Ga.; preliminary training at Chateau Foux, France; advanced training, 3rd A.I.C., Issoudun, France.

Flying Rating: French Brevet, Aug. 1918; Reserve Military Aviator, May, 1919.

War Service: Aug. 1917 to March 1919.

Present Occupation: Salesman and 2nd Vice President, American Lumber and Export Co.

Address: Box 742, Cincinnati, Ohio; home, 1826 S. 14th Ave., Birmingham, Ala.

Kenneth Proctor Littauer

LITTAUER, KENNETH PROCTOR, Writer; born, Newark, N. J., March 13, 1894; son of Alfred Littauer and Evelyn (Proctor) Littauer; married, Helen Averill, June 25, 1919.

Educated: Central High School, Washington, D. C.

Professional: Reporter, magazine writer, and editor, foreign and war correspondent, 1912-1921.

Aeronautical Activities: Service in French Aviation; enlisted, March 1916; aviation schools from April to Oct. 1916; breveted, July 1916; at the front, Escadrille C. 74 Oct. 1916 to Jan. 1918; commissioned Captain in U. S. Aviation, Jan. 1918; promoted to Major, Nov. 1918; at the front from Feb. 1918 to Oct. 1918.

Flying Rating: French Military Pilots Brevet No. 4023, July 1916; U. S. Air Pilots rating, 1921.

War Service: As above.

War Honors: Distinguished Service Cross; Croix de Guerre, with Palm and Star; Croix de Guerre (Belgium); Chevalier de l'Orde de Leopold; three French citations and the following citation by the Commander-in-Chief of the A. E. F.; "For repeated acts of heroism in action near Conflans, France, September, 14, 1918, and near Doulcon, France, October 30, 1918. Major Littauer volunteered on a mission to protect a photographic plane for another squadron on September 14 and continued toward the objective at Conflans even after three other protecting planes had failed to start. In an encounter with five enemy pursuit planes, he completely protected the photographic plane by skillful maneuvering, although his observer was wounded and his machine seriously damaged. On October 30, Major Littauer, on duty as Chief of Air Service of the 3rd Corps Army, volunteered and made an important reconnaissance of enemy machine-gun emplacements at a low altitude near Doulcon."

Member: Advertisers' Club, New York.

Present Occupation: Magazine writer.

Address: Branford, Conn.

Wendel Archibald Robertson

ROBERTSON, WENDEL ARCHIBALD, Insurance Agent; born, Guthrie, Okla., May 7, 1894; son of Robert Scott Robertson and Elizabeth Jane (Wendel) Robertson.

Educated: Fort Smith public schools and Holbrook School at Briarcliff, N. Y.; B.A. 1915, Yale.

Professional: Clear Creek Oil & Gas Co., 1915-1917; Robertson & Shadrach Insurance Co., 1920 to date.

Aeronautical Activities: S.M.A. Austin, Tex., July 1, 1917 to Aug. 15, 1917; flying field, Rantoul, Ill., Aug. 15, 1917 to Nov. 30, 1917; commissioned 1st Lieut., Dec. 1917 and assigned to 108th Aero Squadron; trained at Issoudun, France, in flying and at Cazeaux, France, in gunnery; assigned to 139th Aero Squadron, 2nd Pursuit Group, July 26, 1918; served with that squadron through the St. Mihiel and the Argonne Offensives; assigned to 13th Aero Squadron, Dec. 1, 1918 as C.O.; discharged, April 1919 at Garden City, L. I., N. Y. American Ace, officially credited with destruction of seven German planes.

Flying Rating: Reserve Military Aviator.

Present Occupation: Insurance Agent.

Address: 17 N. 6th St., Ft. Smith, Ark.

Carlton W. Kendall

KENDALL, CARLTON W., Writer; born, Oakland, Calif., Aug. 17, 1895; son of Noah C. Kendall and Ena F. Kendall.

Educated: Oakland High School, 1914; three years, University of California.

Professional: Manager, Bay City Aero Supply Co., Oakland, Calif., 1909-1914; Pacific Coast Correspondent, Fly Magazine, 1912-1913; since 1913, contributor to Popular Mechanics, Scientific American and others; Secretary for the Kendall Investment Co. Inc. of Oakland, Calif.

Aeronautical Activities: Bay City Aero Supply Co., 1909-1914; U. S. Air Service, 1917-1918; carried on a series of experiments in longitudinal control for the government.

War Service: Enlisted in U. S. Air Service, Nov. 1917; commissioned 2nd Lieut. Sig. R. C., A. S., Jan. 1920.

Books: "The Truth About Korea", published by the Korean National Ass'n., 1919.

Member: Authors' League of America, Inc.

Present Occupation: Magazine writer.

Address: Room 79, Bacon Bldg.; home, 1410 Jackson St., Oakland, Calif.

Howard Huntington

HUNTINGTON, HOWARD, Aeronautical Engineer; born, Flushing, L. I., N. Y., Dec. 13, 1885; son of Chester Huntington and Katherine H. (Smith) Huntington; married, Anna Erica Logan, Dec. 20, 1920.

Educated: Private schools in Flushing; 1899-1904, Chapin Collegiate Preparatory School, New York City, later called the Buckley School; B.A. 1908, New York University, Arts and Science, University Heights, Bronx.

Aeronautical Activities: 1908-1909, associated with Glenn H. Curtiss in Dr. Alexander Graham Bell's Aerial Experiment Association, assisting in designing and building the first airplane to fly in public; 1911-1912, designed and built novel airplane; 1914-1915, Huntington Aircraft Co., 1917-1919, Vice President, General Manager, and Chief Engineer of Southern Aircraft Co.; 1919-1920, President and Manager, Huntington Motor Co.

Member: Aero Club of America; American Society of Aeronautic Engineers.

Present Occupation: Aeronautical Research.

Address: 3016 N. W. First Ave., Miami, Fla.

Joseph Henry Carr, Jr.

CARR, JOSEPH HENRY, Jr., Architectural Engineer; born, Mt. Auburn, Iowa, Aug. 14, 1896; son of Joseph Henry Carr, Sr. and Mary Catherine Carr.

Educated: Ames High School; Iowa State College; Ecole des Beaux Arts; B.S. 1921, Mass. Inst. of Tech.

Professional: 1916, engineering construction, associated with W. H. Grover, Consulting Engineer.

Aeronautical Activities: U. S. Air Service.

Flying Rating: Reserve Military Aviator, 1917.

War Service: Enlisted, May 1917; 1st. Lieut., Nov. 1917; Issoudun to 88th Aero, 1st Observation Group, Feb. 1918; assigned to 139th Aero, 2nd Pursuit Group, Sept. 1918; credited with one Fokker, Oct. 29, 1918; commissioned Captain, Dec. 1919.

Member: Aero Club of America; Architectural Club.

Present Occupation: Architectural Engineer.

Address: Ames, Iowa.

Harris Campbell Allen

ALLEN, HARRIS CAMPBELL, Architect; born, Rutland, Vt., Nov. 22, 1876; son of Charles L. Allen and Gertrude (Lyon) Allen.

Educated: Oakland High School, Oakland, Calif.; B.A. 1897, Stanford University.

Professional: Architectural Draftsman, 1897-1908; architect, 1908-1917, 1919 to date; editor, "Building Review", 1916-1917, 1919 to date.

Aeronautical Activities: President, Aviation Examining Board, Kansas City, Nov. 1917 to March 1918; head of Dept. Aerial Reconnaissance, School for Aerial Observers, Post Field, March 1918 to March 1919; Chairman, Aeronautics Committee, American Legion, Dept. of California, 1919-1920; Chairman, Aeronautics Committee, Oakland Chamber of Commerce, 1920-1921; Vice President, Allied Fliers Club, 1921.

War Service: Oct. 1917 to March 1919.

Member: American Legion; Sons of the American Revolution; Allied Fliers Club; American Inst. of Architects.

Present Occupation: Architect and Editor of Architectural Journal.

Address: Central Bank Bldg., Oakland, Calif.; home, 2514 Hillegass Ave., Berkeley, Calif.

Erwin Emil Maurer

MAURER, ERWIN EMIL, Commercial Aviation; born, New York City, July 4, 1894; son of Emil F. Maurer and Lucy B. (Hardy) Maurer.

Educated: Yonkers High School; one year, Amherst College; three years, Stevens Institute of Technology.

Professional: With Otis Elevator Co., R. W. Hunt and Co., Corn Exchange Bank, Wittemann Aircraft Corp.

Aeronautical Activities: Training at Camp Dick, Princeton Ground School, Taylor Field, Kelly Field No. 2.

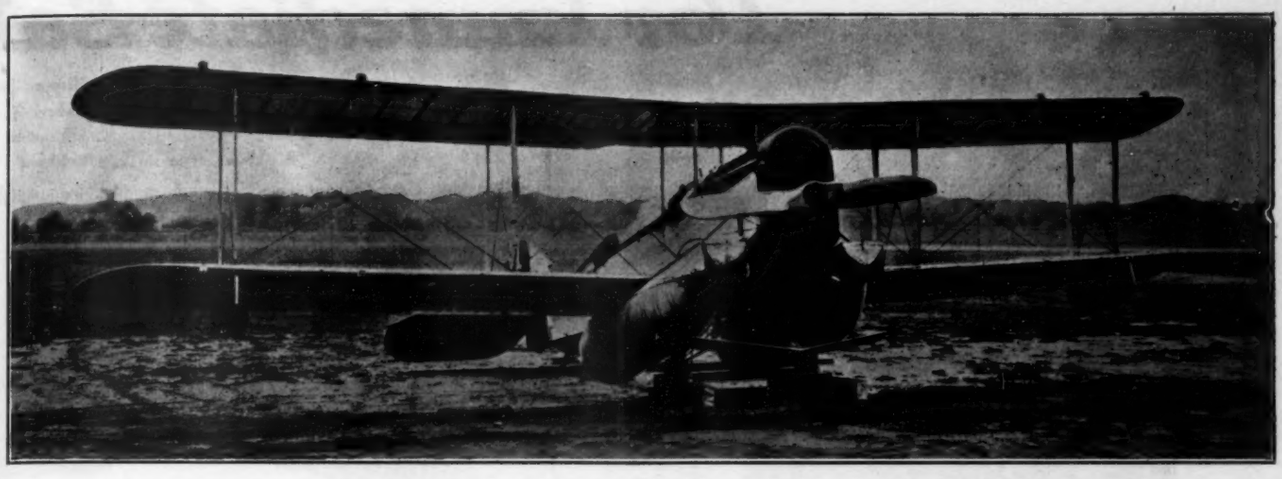
Flying Rating: Reserve Military Aviator.

War Service: U. S. Army Air Service.

Present Occupation: Purchasing Agent, Wittemann Aircraft Corp.

Address: Hasbrouck Heights, N. J.; home, 64 Ludlow St., Yonkers, N. Y.

DH-4 Emergency Flotation Gear



DH-4 Equipped with the Emergency Flotation Gear Developed by the Engineering Division, Air Service. The Air Bags Are Shown Inflated

The construction of a temporary device for the support of an airplane on water in case of a forced descent has occupied the attention of various air services. The possibility of such a descent occurred to Wilbur Wright when he attached a canoe to the skids of his airplane for its historic flight from Governor's Island to Grant's Tomb and return, on Oct. 4, 1909. Glenn H. Curtiss had an air bag attached to the landing gear of his machine when he flew from Albany to New York on May 29, 1910.

A definite attempt to design a flotation gear for emergency uses has recently been made by the Engineering Division of the Army Air Service. The device consists of a pair of collapsible fuselage air bags, front and rear hydrosurfaces, wing floats, wheel releasing mechanism and an air system for the inflation of the flotation bags.

The supporting air bags, made of rubberized fabric, are cylindrical in form with a tapered nose. They are attached by fabric fins to boards of plywood which are supported by brackets, U-bolts and plates under the lower wings on the right and left of the fuselage. Two fabric flaps incase each bag when folded; the bag is then held together at the middle by a series of cones and eyelets. Wire pins are soldered to a cable and run through eyes in the cones. A short pull on the cable releases the seam.

Four compressed air tanks are inst alled in the fuselage behind the gunner's cockpit and connected to act in unison. Pipes convey the air from the tanks to the axle to an injector beyond which two pipes branch off to the air bags. Three air bags, shaped to fit the fuselage and laced to eyelets fastened to the longerons, are placed in the fuselage directly over the tail skid. They are inflated by means of a tire pump and are unconnected with the air system.

To blow off the wheels, after the wheel-retaining pins have been pulled, it is only necessary to open and close the proper devices quickly. The next operation is to pull the bag release cables and open the injector valve, which allows the bags to be inflated.

Plywood floats are attached to the wing tips in the manner usually employed on seaplanes.

The forward hydrosurface is attached to the landing gear to support the weight of the machine from the moment it touches the water until the speed has decreased sufficiently to insure the bags against their being torn from their supports. This surface also brings the center of lift well forward while the speed is decreasing and thus counteracts any tendency of the machine to nose over. Steel tube struts brace the surface horizontally to the landing gear and cables lead from the middle of the hydrosurface to the rear ends of these struts. Cables are also used for vertical bracing from the base of the outside wooden struts to the forward end of the lower longerons.

The other hydrosurface is set at a negative angle at the tail to assist the main hydrosurface in preventing the airplane from nosing over. The tail hydrosurface is made of laminated wood and is strengthened by steel V members.

Close-Up of the Front Hydrosurface and the Main Air Bags Folded Up Against Their Supports

The tests of this emergency floating gear have given satisfaction. After ground tests on the wheel releasing system and the inflating of the bags, a flight was made to test maneuverability and balance. Finally a service test was made, the machine alighting on the water.

The possible uses of an emergency flotation gear are numerous. Such a device can be of great utility in coast surveillance work where, in the absence of seaplanes, land machines have to be flown out to sea for a certain distance. During the late war the Royal Air Force of Great Britain used a large number of DH-6 airplanes in connection with coastal convoy work. These machines were fitted with the Busteed emergency flotation gear, which is similar to the one described.

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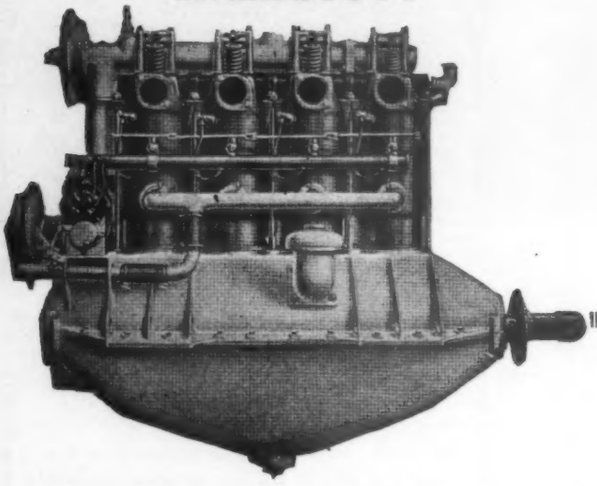

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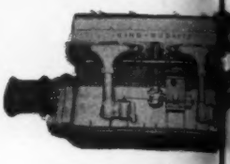

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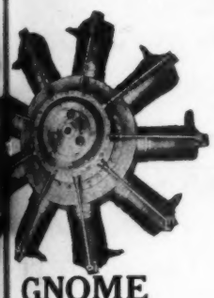

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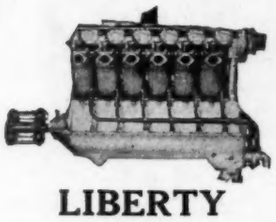

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S ARMY

TICAL EQUIPMENT

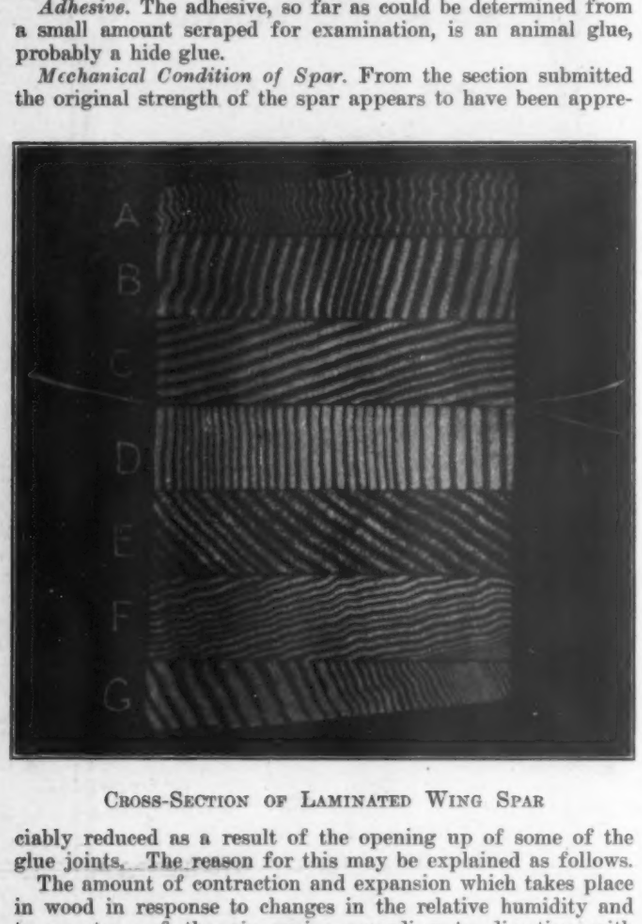
Examination of Laminated Airplane Spar*

Request for Examination. A section of a laminated airplane spar forwarded by the Air Board to the Forest Products Laboratories of Canada, Montreal, for examination was received May 14, the request for examination coming through Dr. A. S. Eve of McGill University. It is understood that the spar from which the section was taken had proved defective in use and that the cause of this was sought.

Identity of Wood. All the laminae were identified as Douglas Fir (Pseudosuga mucronata, Sud.).

Adhesive. The adhesive, so far as could be determined from a small amount scraped for examination, is an animal glue, probably a hide glue.

Mechanical Condition of Spar. From the section submitted the original strength of the spar appears to have been appreciably reduced as a result of the opening up of some of the glue joints. The reason for this may be explained as follows.



Cross-Section of Laminated Wing Spar

The amount of contraction and expansion which takes place in wood in response to changes in the relative humidity and temperature of the air varies according to direction with reference to the annual rings. As a general statement radial† shrinkage is only about three-fifths as great as tangential‡ shrinkage, longitudinal shrinkage usually being so small as to be negligible for practical purposes. The accompanying photograph shows a cross section of the spar through the unspindled (i.e. ungrooved) portion. Whenever the timber of the spar contracted or expanded with changes in moisture conditions laminae *C* and *E*, being practically flat sawn (or tangential) boards, shrank or swelled appreciably more than lamina *D*, which is a quarter sawn (or radial) board, the resulting stresses finally causing failure of the joints and a consequent reduction in the strength of the spar.

At various points along the spar there was complete separation between lamina *D* and those on either side of it so that daylight could be seen between them. At the section photographed there was complete separation at the joint indicated, namely, that between *C* and *D*, where the difference between the direction of the annual rings is a maximum. The stresses in bending, although at right angles to those brought about by the unequal expansion and contraction of the laminae, would doubtless contribute to the separation of the laminae at these joints, making it more complete.

Similar stresses would act at the joint between laminae *B* and *C* and at that between *F* and *G* but would be smaller, as indicated by the direction of the annual rings. Very probably, however, the original strength of these joints has been somewhat reduced.

The following rules should be observed in laminated construction generally:

1. All material should be quarter sawn if possible.
2. Quarter and flat sawn laminae should not be used in the same piece of work.
3. All laminae should be brought to the same moisture content before gluing up.
4. All laminae in the same piece of work should have approximately the same specific gravity.
5. All laminae in the same piece of work should be of the same species.

In the case of the spar examined rule No. 2 had not been followed, with the result indicated above.

* Technical Memorandum No. 4, Air Board of Canada.

† i. e.—That in a direction approximately at right angles to the annual rings.

‡ i. e.—That in a direction approximately tangential to the annual rings.

Book Reviews

The Dynamics of the Airplane. By Kenneth P. Williams, (John Wiley & Sons. 135 pp., 50 ill.)

Mr. Williams is Associate Professor of Mathematics at Indiana University, and during 1919 attended some lectures by Professor Marchis at the University of Paris. The preface states that the book is an outgrowth of those parts of Professor Marchis' lectures that were of particular interest to the author. Questions of design and construction are barely mentioned. The text is intended for students of mathematics and physics who may be interested in aero-dynamics.

From this point of view the author has done an excellent piece of work, which no doubt will be largely used by teachers and students of physics and mathematics.

The book should also be of service to students of aeronautical engineering, particularly in the early stages of their work, as certain fundamental aspects of aeronautical theory are very clearly brought out.

While for a purely mathematical treatise on the subject, the book may be classed as elementary, it is very sound and clear.

Beginning with a consideration of the plane and cambered surface, Professor Williams develops; somewhat after the style of French authors; theorems regarding straight horizontal flight, optimum angle, etc. Descent and ascent are similarly treated. The well known empirical equations for time of ascent are given.

The relation of propeller and motor characteristics is dealt with graphically. Performance and Radius of Action are but briefly dealt with.

The author is not so sound in his treatment of stability. The only value of the two chapters on this subject is to present in simple fashion the equations of motion in three dimensions, and the criterions of stability.

Soaring Flight. By Lt. Col. R. de Villamil. (48 pp. Charles Spon, London.)

In view of the growing interest in soaring flight, this pamphlet is timely.

Colonel de Villamil collects and criticizes the views of a number of observers of bird flight such Lord Rayligh, Peal, Sir Hiram Maxim, Lanchester, Dr. Hankin, and others; and comes to the conclusion that a solution of the problem of soaring flight is possible based on the following data:—

The wind in respect to the earth may be assumed to be practically horizontal. The wind may be assumed to be uniform. The bird may be assumed to supply no energy.

The author then demonstrates by simple mathematical methods, that with the above assumptions, a bird may move steadily forward by circling flight, and changes of altitude.

Across the Central American Andes

News to hand from Honduras, C. A., states that the first aerial flight made in that country, in the course of which the Central American Andes were crossed, has been effected by Dean Ivan Lamb on a Bristol Fighter type F.2-B. The route traversed was between San Pedro Sula and Tegucigalpa, the capital of Honduras, a distance of some 200 miles which was covered in 1 hr. 23½ min. During the flight an altitude of 18,000 ft. was reached.

Mr. Lamb during the late war served in the Royal Flying Corps with the rank of Sergeant-Pilot, and afterwards became contributing editor to AIRCRAFT JOURNAL before that publication merged with AVIATION. He has for the past year been Chief of Aviation of the Republic of Honduras and in this capacity he has done a great deal of preliminary organization work, which has now been crowned by his flight across the Central American Andes. In a letter to the editor, Mr. Lamb gives the following interesting details of his trans-Andean flight:

"Early in the morning of the 18th (of April) I took a flight with Dr. Waller as passenger in order to test the machine for altitude and weight carrying. Dr. Waller weighs 180 pounds and I took an additional 100 pounds of sand. Descended after reaching an altitude of 14,000 ft., but on landing my tail skid hit a rock and broke two wires in No. 7 bay, which was more than difficult to repair.

"After many vexatious delays all was ready to start the motor at 4:15 p. m., but it was 20 min. later when the motor was sufficiently warm and oil circulating freely. The oil guage was not working, and the tachometer was all wrong, as it only showed 1500 revs wide open and 1600 revs on half throttle. It was really too late to start on such a trip over uncharted territory that probably did not contain a single place in which the machine could land safely in case of motor trouble. But they were more than anxious about the machine in the capital, and as the weather would probably be worse to-morrow, I decided to make the attempt.

"At 4:35 p. m. I taxied out across a narrow and very rough stubble field and took off directly over the cemetary and town. My cargo consisted of three suit cases, camers, typewriter, two wheels, fittings, tools, axle, two undercarriage V's, tail skids, etc., or a total of approximately 350 lb. Almost immediately the engine began to overheat and I pulled back to half throttle and a moment later headed south steadily climbing.

"The overheating of the motor was due to its newness and the very hot climate, but I believed that it would run easier at higher altitudes and took that chance. According to the map the railroad ran almost straight to the South as far as Portrerillos, where it ended. After a moment I discovered that it ran in the general direction of S. E. and that it made many great curves around the mountains. There were only one or two places where it might be possible to land the machine in case of necessity, but I should not care to be forced to try it.

"Twenty minutes later I picked up the town (Tegucigalpa) from an altitude of 10,000 ft. and headed directly south where the map led me to believe that I would find the Lago de Yojoa. Failing to find the lake at the proper time I headed East and picked it up at 14,000 ft., so that the map must be some twenty miles out of the way. Until I picked up the lake, the whole distance had been over absolutely unbroken jungle and mountains that rose straight up and down, and no valleys between. Reached the lake at 14,000 ft., with the motor running cool and easy, but still continued to climb.

"For the next ten minutes I was over a large upbroken cloud bank. Just as I cleared this I picked up the wagon road to the capital and, heading due East I located Siguatepeque from an elevation of 18,000 ft. Here I switched to the front tank, opened the throttle a bit more, altered my stabilizer for horizontal flight, and the air speed touched 115 m. p. h. and stopped there. It was bitterly cold despite my heavy coat, and the wind would get under my goggles and bring tears to my eyes. The haze was quite heavy and the map would only lead me astray, so I headed toward Coymayagua trusting that I would be able to pick up the peculiarly shaped mountain I had noticed when passing through on a mule several months before.

"Again luck was with me, for I picked up the mountain dead aheah and nosed down the machine until she was batting 130 m. p. h., because it was beginning to be rather late to be wandering around in the air in an unmapped country. Five minutes later I saw the city to my left and about 10,000 ft. below. The aneroid read 13,000 ft. A long straight wagon road lead me straight to Flores, where I began to climb again and swing more to the eastward over Proteccion, at the foot of the

DEAN IVAN LAMB, CHIEF OF AVIATION, REPUBLIC OF HONDURAS

mountain. I was touching 16,000 ft. at the highest point of the range and the peaks certainly did look uncomfortably close. Just at this point all the air bumps, cross currents, and winds of the world seemed to have gathered, and for awhile it was more than unpleasant flying.

"It was now really getting dusky as well as more hazy, and I was forced to come down a bit in order to distinguish the wagon road, but this was only more confusing, because I could not distinguish trails from the road. Then I picked up a lake that was not shown on the map and that I had never heard mentioned. I admit that I was lost, because I should have been in sight of the city by then. So I made a large circuit around the lake, then another, larger circle, and when I circled for the third time I caught what appeared to be a slightly heavier haze to the West. Heading toward it, a moment later I came out directly over Tegucigalpa well hidden in the hills.

"It certainly did look good to me, so I made a couple of

wingovers and a few fancy turns, and then on to the airdrome at Tocantin, three miles outside the capital. The road was lined with cars and thousands of running natives. A moment later I made a perfect three-point landing in the marker ring and was met by the President and his cabinet, two regiments with a band, and all the notables of Tegucigalpa. The President further honored me by inviting me to dine with him and his family.

"That is the history of the first real flight over the backbone of Central America. The actual flying time was 1 hr. 23½ min. from the time my wheels left the ground at San Pedro Sula until I stopped rolling at Tocantin."

Performance of a 300-hp. Hispano-Suiza Airplane Engine

N. A. C. A. Report No. 103

A 300-hp. Hispano-Suiza engine has been tested at the Bureau of Standards. The program of tests was planned in cooperation with the Engineering Division, Air Service, and was intended primarily to determine the characteristic performance of the engine at various altitudes. The engine was operated at the ground, at 25,000 ft., and at intermediate altitudes, both at full load and at loads similar to those that would be imposed upon the engine at various speeds by a propeller whose normal full-load speed was 1,800 r.p.m. Friction horsepower also was determined in order that the mechanical efficiency of the engine might be calculated.

From the test data there were computed the brake horsepower; brake mean effective pressure; specific fuel consumption; mixture ratio; jacket loss; exhaust loss; and thermal, mechanical, and volumetric efficiencies. A record of jacket water temperatures, oil temperatures, manifold pressures etc., shows the conditions under which the test was made.

A brake horsepower of 352 was obtained at 2,200 r.p.m., and a maximum brake mean effective pressure of 128 lb. per square inch at about 1, 600 r.p.m. The mechanical efficiency varied from 88 per cent to 83 per cent from speeds of 1,400 r.p.m., to 2,200 r.p.m., while the brake thermal efficiency, based on the lower calorific value of the fuel, was about 26 per cent over this speed range. At 1,800 r.p.m., and at an air density of 0.040 lb. per cubic foot the brake horsepower was about 42 per cent and the indicated horsepower about 47 per cent of that at the ground.

A copy of Report No. 103 may be obtained upon request from the National Advisory Committee for Aeronautics, Washington, D. C.

Relief Expedition of Airplanes to the Pueblo Flood

The exepdition of three airplanes sent out from Post Field Fort Sill, Okla., to render assistance in connection with the flood at Pueblo, Colo. adds to the already large field of usefulness in which the air plane can be utilized. The machines were sent to Pueblo to patrol the Arkansas River, Fountain Creek and their tributaries and dams and keep the city informed in case of a second flood or in case any dams or rivers gave way. The machines left for Pueblo on Sunday afternoon, June 5th, by way of Dodge City. They were equipped with machine guns, radio and photographic equipment, and piloted by Major Follert Bradley, A. S., First Lieut., Fred C. Nelson, A. S., and First Lieut. K. N. Walker, A S.., with First Lieut. Joseph T. Morris, A. S., and Sergeants Gall, Shephard and Corporal Brugh as passengers.

Skirting a number of heavy storms, the machines landed at Dodge City, Kan. at 6:45, and found that city in a small state of excitement anticipating the flood which, it was contemplated, would reach there about noon the following day. Shortly after the landing at Dodge City, a heavy rain began, which continued until 11:00 o'clock Monday morning, at which time the machines took off for Pueblo. Conflicting telegrams from officials of the state of Colorado as to service facilities were received by Major Bradley, who decided that it was advisable to land at Lamar, Colo. approximately 90 miles from Pueblo, and take on additional fuel in order that the machines would not be stranded when arriving at destination in case fuel and oil could not be secured. Shortly after the landing at Lamar another heavy rain fell. During let-ups of the storm the planes were fuelled, and at 4:00 o'clock the rain had subsided to such an extent that they again took off for Pueblo, following the river up to that city. No telegraphic communications could be received from Pueblo, but the mayor of Lamar had been informed unofficially that a second flood had struck Pueblo, worse than the first one, and that a five to ten foot rise was on its way and requested that the radio operators be prepared to receive messages from the airplanes as to river conditions from Lamar to Pueblo. Radio communication was held with Fort Lyons by Lieut. Morris. The rumor of the second flood proved to be unfounded, and Fort Lyons was requested to inform the towns east of the Fort that no further danger need be anticipated in connection with this second flood.

The airplanes arrived at ten minutes past five at Pueblo and flew over the city. The first impression of the city that one had from the air was that of a child's toy village which had been inadvertently kicked over by some careless foot. The business section of the town was the portion which had received all the damage. Box cars were strewn in all positions; in back yards of stores, upside down and crosswise of the tracks. Buildings seemed to be swinging at all positions from their original foundations. One lumber yard, which formerly occupied half a block, was strewn over the lower part of the city. One steel bridge spanning the Arkansas River was broken in two and the sections lay alongside of each other. After circling the city, a landing field was selected four miles south of Pueblo's business district on the edge of the town and west of slag dumps of the Colorado Fuel and Iron Co. The field was an excellent one, nearly a mile long and half a mile wide and level.

Colonel Hamrock, Adjutant General of the State of Colorado, arrived at the field shortly after the machines landed, and the officers were taken to the Congress Hotel, at that time the headquarters of the Colorado National Guard and Colorado Rangers, who were in charge of the flood situation. Being located on high ground, this hotel fortunately escaped the flood. It was crowded and very cosmopolitan in appearance. It seemed that everyone who had had any service whatever was wearing a uniform. Ex-emergency officers, National Guardsmen, Colorado Rangers, Ex-Royal Air Force officers, Marines and Sailors thronged the place and, together with civilians carrying guns and wearing various kinds of badges, made quite an interesting spectacle. A dynamo of the flooded electric plant was put in operation which furnished the hotel with light, the only building in town so furnished.

No flying being required the next morning, an inspection of the devastated district was made on foot. Dead animals and overturned automobiles were strewn about the city. The mud in some places was four and five feet deep. One Italian settlement was completely washed out; nothing but faint signs of former foundations being in evidence, and all buildings in direct line of the flood were either washed away or their foundations so shaken that they were unsafe to enter. Crews of men in rubber boots and armed with shovels were hard at work endeavoring to clean up the mess. It was nearly impossible to visualize the destruction caused by the high water unless one were actually on the ground and witnessed it. The excellent spirit of the citizens, many of whom had lost everything, was remarkable.

In the afternoon patrols were made of the rivers for 50 miles, and favorable reports were returned to Military Headquarters. There were no further cloud bursts in the mountains, and no further danger from the river was imminent. Daily patrols were made until Saturday morning, at which time the Adjutant General released the airplanes so that they could return to Fort Sill.

Lieutenant-Colonel Cables, Engineers, requested that a mosaic map be made of Pueblo and a number of devastated mountain towns. An additional machine, more fully equipped for making mosaic maps, was requested from Post Field in order to accomplish this mission effectively.

The machines left Pueblo at 1:30, returning by way of Dodge City, arriving at Post Field at 8:45 P. M., making the return trip in six hours and fifteen minutes against a strong wind all the way.—Air Service News Letter.

Airdrome Notes

Milwaukee

A white circle 80 ft. in diameter marks the Hamilton Aviation Field at Milwaukee, Wis., on a road five miles south of the Milwaukee Post Office and two miles south of the lake. The field comprises 260 acres of which 100 acres is level for one mile straight-a-way. The Hamilton Aero Manufacturing Company has a five year lease on the field. As the company's principal business is the development and production of propellers they are making a speciality of propeller service. They maintain a complete propeller shop with humidity control so that the probable operation of propellers at different temperatures and seasons of the year may be thoroughly tested. A hangar and repair shops for airplanes are also maintained.

White Bear Lake, Minn.

The White Bear Lake Business Men's Association has leased a tract of land for a landing field, immediately N. W. of this village. The Harold G. Peterson Aircraft Co. has built a hangar on the property, and has started and will maintain a school for pilots. They will also engage in all forms of commercial aviation such as aerial photography, passenger and merchandise carrying, aerial advertising, etc. Instruction will be given by Lieut. Harold G. Peterson who was chief acrobatic instructor during the war at Ellington Field, Texas. The officers of the company are: Lieut. Harold G. Peterson, President; Donald E. Edgar, Vice-president; Lieut. Robert C. Murray, D.C.M., M.M., secretary-treasurer.

Belleville, Ill.

Scott Field, Belleville, Ill., is to become an airship station on the lighter-than-air route which the Army Air Service is planning to establish between Langley Field, its main airship establishment on the Atlantic coast, and the three airship stations available for the surveillance of the Mexican border, namely, San Antonio, El Paso and Arcadia, near Los Angeles.

Oklahoma City

Airplanes to be the nucleus of a Mexican air mail service recently left Oklahoma City en route for Mexico. The machines came from Lincoln, Neb.

Nashville, Tenn.

An airdrome twelve miles from the city is being put into condition to receive the equipment of the Tennessee National Guard Aero Squadron.

Newdorp, Staten Island, N. Y.

The coast defense airdrome at Newdorp, Staten Island, N. Y., known as Miller Field, has been completed. Facilities exist for both land and water machines.

The field is 3200 ft. long and 1625 ft. wide. Repair shops are available as well as a direction finding radio station. The airdrome is operated by the Army Air Service.

New Airdromes

Information has been received from the Office of the Director of Air Service, War Department, of the following additional landing fields for aviators: Georgia, Emergency field at Canton; Long Island, N. Y., Emergency field at Mattituck; Virginia, Lyle Field, municipal, at Staunton.

Tampa, Fla.

An airdrome is planned in West Tampa adjoining Benjamin Field.

Morehead City, N. C.

The coast guard aviation stationed here, ordered closed as from July 1, may continue in operation if the agitation aroused against the closing of the station takes effect.

Marshfield, Wis.

A field, comprising about 15 acres, bordering on South Central Ave., and north of White City park is being used as an airdrome. No information is available regarding airdrome marking, or facilities for repairs and fuel.

Cincinnati, O.

Besuden Field, on Reading Road, near Bond Hill will be used as an airdrome by the Aircraft Service Co. which, in addition to carrying passengers, will maintain machines for exhibition and photographic work.

Chicago, Ill.

Seaplane service from the Edgewater Beach Hotel to the Boulevard Link bridge has been started by W. LaParle in a Curtiss Seagull.

Minneapolis, Minn.

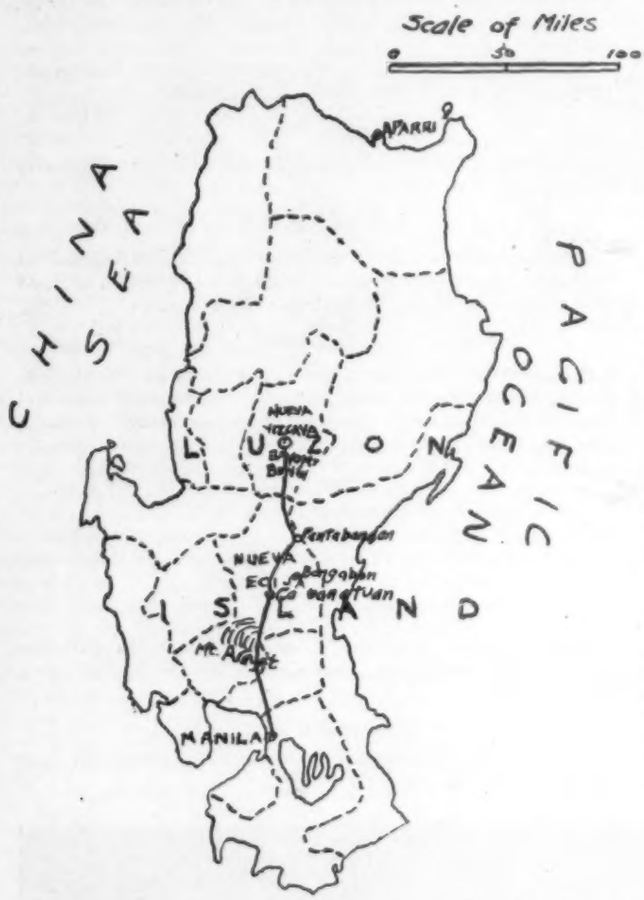
The Aero Club of Minneapolis conducted a successful meet at Speedway field on June 22.

AERIAL VIEW OF THE ESTABLISHMENT OF THE CURTISS AEROPLANE AND MOTOR CORP. AT GARDEN CITY, N. Y.

Railroad Reconnaissance by Airplane

Locating a railroad by airplane is the latest venture of the Third Aero Squadron, Camp Stotsenberg, Philippine Islands, and one long flight has enabled a railroad engineer to determine which one of the three general routes will be utilized for the new road. Instead of three parties of locating engineers being sent out to make the preliminary survey only one will now be necessary.

The Manila Railroad Co. has planned the extension of its line from Cabanatuan through parts of the provinces of Nueva Ecija and Nueva Vizcaya to Bayombong. Parts of the two provinces are very thinly settled and no comprehensive maps or surveys were available. The military authorities are vitally interested in the extension of the Manila Railroad



Co. line, and accordingly permission was obtained from the Commanding General, Philippine Department, to use a government airplane on the preliminary reconnaissance trips.

The first trip was made by E. S. Von Piontowski, Chief Engineer, in a DH-4 piloted by Lieut. W. C. Maxwell, 3rd Aero Squadron, Lieutenant Maxwell, with the railroad official in the gunner's cockpit passed over Mt. Arayet and then followed the Pampanga River until he picked up the railroad line at Gupan. He followed the river from Cabanatuan on to Pantabangan and over Mt. Pangloriahan, thence to Bayambong. The railroad engineer on the return was enthusiastic over the trip, declaring that the single flight has saved him months of tedious work in running lines through difficult territory. Before the surveying party is sent he plans at least one additional reconnaissance trip.

In this connection the account of the survey by Chief Engineer E. S. Piontowski will be of interest as it bears testimony to the value and saving of time and money of the aerial reconnaissance in engineering projects. Mr. Piontowski writes:

"The flight was in the nature of a trial trip as I had never been up in the air before and had no idea whether any information of real value could be obtained or not. The trip was a revelation to me and I cannot understand why airplanes were never used before in reconnaissance surveys, for as much can be accomplished in one day with a plane as would take months of time and thousands of dollars to do by instrument surveys. The flight was taken at the beginning of the rainy season and shortly after our arrival at the pass the clouds came down and covered the summit of the mountains rendering it impossible to obtain any idea of the other side of the range and the outlets thereto. However, I obtained enough information on this side to demonstrate how much could be done by flights in the dry season; as it was, I can eliminate two lines on this side that the engineers on survey would necessarily have had to try, and which would have taken many months and great expense to make.

"At present the Manila Railroad has constructed the Cabanatuan branch as far as Cabanatuan and contemplates prolonging this line north through the mountains into the Cagayan valley, and eventually to Aparri on the extreme north end of the Island of Luzon.

"There is no question but that in mountainous and heavily timbered country of which no accurate maps exist, the saving that could be effected by several flights over proposed lines would be enormous, and I anticipate in a short time all railroad surveys through unknown country will be preceded by airplane investigation."

Italy's Surplus Aircraft Equipment

Lt. Col. A. Guidoni, Italian Air Attache, has informed the Chief of Air Service that, owing to certain unreliable concerns having purchased old and used areonautical material which they, in turn, have marketed as new, the War Department of Italy, through the Superior Command for Aeronautics, has issued the following statement:

"For the information of all concerned, the War Department (Superior Command for Aeronautics) announces that no individual or agency has been charged with the sale of aeronautical material belonging to the Government whether residue from the war or otherwise, but instead the Department will provide for the sale of such surplus material directly or through the 6th Committee of Alienation.

"Regarding certain material previously sold and later used for speculative purposes and represented as in flying condition without the necessary inspection by technical specialists, the War Department announces that the Government cannot give any guarantee of the efficiency of such material, as it will guarantee only such material as has been sold directly or through the 6th Committee of Alienation and for which certificates of navigation have been issued.

"This statement is also for the protection of the good name of the Italian Aeronautical Construction Industry."

Royal Aero Club Seaplane Races

The Royal Aero Club of the United Kingdom seaplane races, will be held at Cowes, Isle of Wight, on Aug. 1 and 2, 1921. The first race will be the Isle of Wight Handicap over a course of 80 nautical miles, from a point off Cowes to Ventnor, out and back twice, passing Ryde, Sea View and Foreland. The prize will be a trophy of the value of £100 presented by Lieut. Col. F. K. McClean, and £250 presented by the Royal Aero Club.

The Solent Handicap will be held on Aug. 2, over a course of approximately 80 nautical miles, over a circuit of 20 nautical miles, situated in the Solent. Four laps of the circuit must be made to complete the course. The circuit will include a point off Cowes, No Man's Fort, Horse Sand Fort, and Spitbank Fort. A prize of £250 will be presented by the Royal Aero Club.

International Balloon Race

The Balloon Committee of the Aero Club of America has selected the following team to represent America in the International Balloon Race to be held in Brussels, Belgium: Ralph Upson, Bernard Von Hoffman, and Wade T. Van Orman. Preparations are actively being made for their participation in this event and we have a good chance to bring the Gordon-Bennett Cup back to America.

Naval Air News

Naval Airship ZR Due in August

The U. S. naval airship ZR-2, completed and tested in the shed and on a short flight, according to news dispatches from London wil be due in the United States about August 15, with the U. S. Navy Detachment which had been on duty during the ship's construction operating the dirgible on her voyage to this country, under command of Comdr. Louis H. Maxfield. The contract for the ship calls for delivery by the Air Force to the Navy in England. Lieut. Clifford A. Tinker, U.S.N.R.F., has been assigned to make the trip aboard the ZR-2, and left on the U.S.S. Utah for Cherbourg on July 5. Major Percy E. Van Nostrand, U.S.A., of the office of the Chief of Air Service, will also be a passenger and will probably make the voyage to Europe on the Utah.

Navy Aviation Turns Back Funds

The Navy will turn back to the treasury approximately $1,993,000 as an unexpended balance for the naval aviation appropriations for 1921. The accumulation of this fund is due to the fact that the Navy could not preceed with the rigid dirigible hangar at Camp Kearny for the reason that the War Department declined to turn over a portion of the camp for this purpose.

Manual on Navy Aviation

In order that line officers of the Navy may have an opportunity to study aviation, the Bureau of Navigation has approved the plan for the compilation of a manual on the general subjects of aviation, organization, activities, airplanes, engines, equipment, use aboard ship, and other details. When this manual has been compiled and approved, it will be issued to the line officers of the Navy, and therafter questions on aviation based upon the general subject as treated in the manual, will be part of the examination of line officers. The plan is now under way, but it is not expected that either the manual or the questions for examination will be ready for issue much before the first of next year, or possibly later. A tentative series of questions was submitted to the Bureau of Navigation as an outline of the subject which should be covered in the new manual.

Aerial Patrol of Sea Lanes

Acting Secretary of the Navy Roosevelt has asked the House Committee on Naval Affairs to include in the Legislative Naval bill for 1921 a proviso "that naval aviation shall have cognizance of the aerial operations necessary to gain and exercise command of the sea and of such stations and craft as are necessary to insure adequate aerial patrol of the sea lanes for these purposes." Under existing law dividing aerial responsibilities between the two Services, the Navy is not charged with keeping open the sea lanes for coastal shipping. This, says Mr. Roosevelt, "is an integral part of the Navy's duty and was the major work it performed in aviation during the late war. The Navy's development of aircraft is toward types that can perform this duty. In war time the Navy will have to and should do this work and the army will not have suitable planes for it and, moreover, the Army will be occupied on its legitimate function, the land defense. It is extremely desirable as a matter of national policy that Congress fix responsibility by law for the defense of the United States in conformity with the approved plans of the War and Navy Departments as promulgated by the Joint Board."

Trade Note

NEW TOOLS ANNUAL. (The Industrial Press, New York. 60 pp.)

Firms using or dealing in tools and machinery for aircraft and other manufacture will be well repaid by a perusal of this pamphlet published by *Machinery*. The annual is in two parts. The first part is a condensed summary for buyers and users of machine tools and other mechanical equipment described in *Machinery* from April, 1920, to March, 1921. This is arranged alphabetically, with a reference to the number in which the complete description appeared. The second part is *Machinery's* Product Index.

The pamphlet is well arranged and admirably suited for reference to product and manufacturer.

New York to Cleveland by Flying Boat

Following the route of the cabin flying boat Santa Maria of the Aeromarine Airways, Inc. in its recent flight from New York to Toronto, Cleveland and Detroit, another Aeromarine-Navy flying boat of the HS-2L type will leave New York with a complement of five people, including pilot and mechanic. The machine will be piloted by D. G. Richardson, with F. F. Sanborn as mechanic. James McKay, a Cleveland businessman, and Harry Bruno of the Aeromarine Airways will ride as passengers. Floyd Showalter, another pilot, will join the party at Ticonderoga, N. Y., at the northern end of Lake Champlain.

The flying boat has been purchased from the Aeromarine Co. by the Great Lakes Airways Co., Inc., an Ohio corporation with offices in the Sincere Building, Cleveland. The

SHIPPING MILLINERY VIA AEROMARINE AIRWAYS
Photo Underwood & Underwood

purpose of the trip is not only to deliver the ship to its new owners, but also to demonstrate to chambers of commerce and other civic bodies of cities en route the practicability of commercial flying boat transportation. Mr. Bruno will be in charge of this work and will give several talks by invitation of civic bodies.

The route the HS-2L flying boat will fly is as follows: New York to Ticonderoga via the Hudson and Lake George; to Burligton, Vt. on Lake Champlain; across the lake to Plattsburg, N. R., to Montreal; St. Lawrence River to Ogdensburg, N. Y., Thousand Islands, Alexandria Bay; via Lake Ontario to Oswego, N. Y.; to Charlotte (6 miles from Rochester, N. Y.); over Niagara Falls to Buffalo, Erie, Pa., and Cleveland, Ohio.

The Great Lakes Airways Co. proposes to run a flying boat service between Cleveland and Detroit with a fleet of four HS-2L six-seater flying boats. The officers of the company are: T. P. Cagwin, president; Arthur H. Denison, vice-president in charge of flying operations; Rex L. Uden, vice-president in charge of traffic and business departments; W. F. Lynch, treasurer; Benjamin A. Gage, secretary. The directors of the firm are: Clarence A. Pfeffer, J. M. McIntosh and Myron H. Wilson, Jr.

Naval Appropriation Bill Passed

The naval appropriation bill for the fiscal year 1921-22, as redrafted by the conference committee of House and Senate, was adopted by both Houses of Congress on July 11. The bill carries a total appropriation of $410,000,000.

The construction of one aircraft carrier at $26,000,000 is authorized and provisions are made for the proposed naval air stations at Sand Point, Wash. and Camp Kearney, Calif. An item of $6,500,000 for naval aircraft construction, which had been added by the conferees to the amount carried for this purpose in the original House bill, is retained in final draft of the bill and so is the provision for a Bureau of Aeronautics.

Foreign Aerial Transport

London-Paris Service

It is announced that the air service between Paris and London operated by the *Compagnie des Grands Express Aeriens* has been increased to four services weekly in each direction, airplanes leaving Paris on Mondays, Wednesdays, Thursdays and Fridays, and London on Tuesdays, Thursdays, Fridays and Saturdays. It is intended ultimately to run a daily service. The foregoing is in addition to and has no connection with the Handley-Page and Instone London-Paris service.

The DeHaviland Co. intends to run a third D.H. 18 passenger airplane capable of carrying 8 passengers on each journey at a speed of 100 m.p.h., the operating cost of which, including all overhead charges, will amount to a fraction of over 3½d. per mile per passenger, or no more than the present railroad first-class fare.

Belgian Congo

It is reported that the directors of the Forminiere Diamond Mines Co. have suggested the inauguration of an air service by seaplane, which would operate between the mines of Djoko Punda, on the Kasai (a tributary of the Congo), and Kinchassa, on the Congo, from which latter point the railroad runs to Matadiroki, a steamer port on the lower Congo. The directors offer to defray the greater part of the initial cost of the scheme. In the meantime a survey of the route is being undertaken. The distance from Kinchassa to the mines is approximately 500 miles, which could be covered in two days, as contrasted with over a month by the existing river transport.

French Guiana

From French Guiana comes another lesson. Along the River Maroni are valuable gold and forest workings, which have hitherto been handicapped constantly by the slowness and discomfort of the river transport, effected mainly by canoe. Passengers and goods, owing to the rapids, have to be handled frequently on the river banks, and then re-embarked. Now, however, by a service of French seaplanes, a voyage up the Maroni, which takes some twenty days by canoe, can be accomplished in a few hours by air.

Apart from the benefit which the Dominion Prime Ministers can bring to their own territories by the introduction in suitable districts of connecting "airways" says the London *Times*, "the starting of such services, and the provision of machines and equipment for them, is of vital interest to the aircraft industry. Designers and constructors are in a position to provide seaplane and flying-boats for coastal, river, or inter-island flying. There is being developed a new school of design in comparatively slow-flying, big-load transport airplanes which would be particularly useful for work overseas; and a newly developed craft like the "amphibian", capable of rising from or alighting on, either land or water, should be especially interesting to some of the Dominions.

Anglo-Danish Agreement

According to a report by Consul George S. Messersmith, England and Denmark signed on Dec. 23, 1920, an agreement relative to aerial navigation between the two countries. The accord is based on the international convention.

In Denmark airplanes and hydroplanes must descend at Christians Havn; in England airplanes at the present airdromes, and hydroplanes at Felixtowe.

The crossing over the Danish frontiers may be made at any point, but for England airplanes must enter between Folkstone and Dungeness and hydroplanes must enter between Orfordness and the Naze.

Aerial Police in Michigan and Canada

Two police organizations which are adding airplanes to their equipment are the well known Royal Canadian Mounted Police and the Michigan State Police.

The former organization intends to use aircraft in their patrol of the border, where drug and liquor running are causing much trouble. The Michigan State Police is also planning to check "rum-running" by means of aerial patrols, for the use of which several air stations are being established throughout the State.

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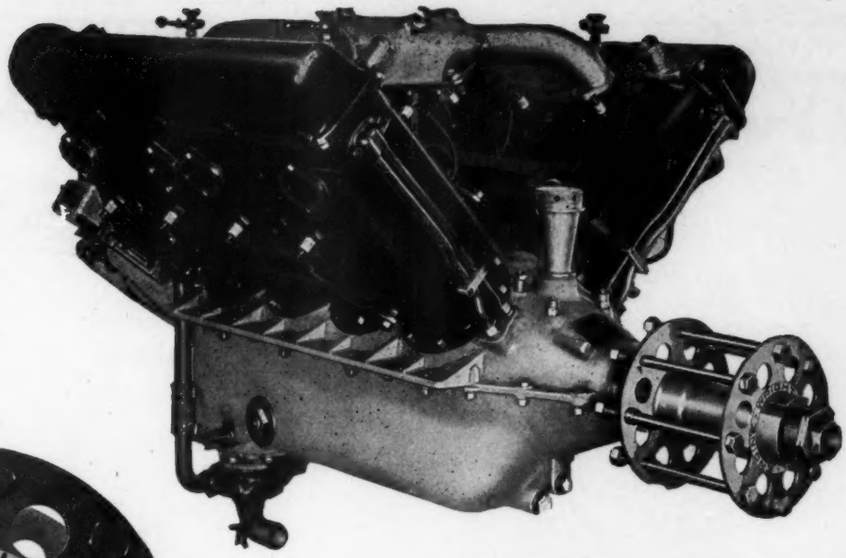

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" " 1800 "	200 H. P.	326 H. P.
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INDEX TO ADVERTISERS

A

Aeromarine Plane & Motor Co..... 90
Aircraft Materials & Equip. Corp..... 117
Aircraft Service Directory..... 118

B

B. G. Corporation, The..... 117

C

Curtiss Aeroplane & Motor Corp..... 91

D

Dayton Wright Co..... 92
Diggins, Ralph C., Co..... 117

H

Hartshorn Stewart Co..... 117
Huff, Daland & Co., Inc..... 119

K

Klemin Alexander & Associates..... 116

L

Laird, E. M., Co..... 116

M

Maguire Petroleum Co..... 120
Martin, The Glenn L., Co..... 94
Mayer Aircraft Corp..... 116

N

Navy Department..... 115

T

Thomas-Morse Aircraft Corp..... 93
Topper Max & Rosenthal 116

W

War Department Air Service..... 104-105
Wellington, Sears & Co..... 116
Where to Fly..... 112
Wittemann Aircraft Corp..... 119
Wright Aeronautical Corp..... 113

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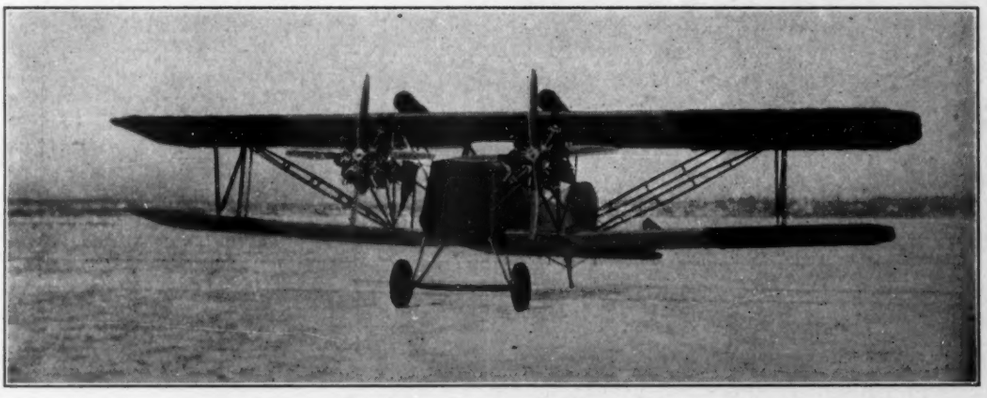

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